New Zealand JOURNAL of AGRICULTURE

OCTOBER 1946

ERIAL MYCOLOGICAL
16 DEC 1946
NSTITUTE

It's the Hidden Features plus Engineering Skill that make

MASSEY-HARRIS MOWERS

—DO A BETTER & EASIER JOB

There's a complete line of Massey-Harris Mowers for every size and type of farm—designed, engineered, tested and field-proved to do a better and easier job. Talk to men who own Massey-Harris Mowers. You'll want one on your farm. Massey-Harris is making more mowers than ever before—it takes more to satisfy the demand.

Massey-Harris Engineering brings to you

7 Big IMPROVEMENTS
in Mower Construction

1 **LIGHTER DRAFT**
Means greater production, lower power costs, and easier work for your horses.

2 **SMOOTHER RUNNING**
Ensures quieter operation, greater comfort, less vibration.

3 **CLEANER CUTTING**
The precision lined cutter bar of the Massey-Harris is your assurance of clean cutting and a neat swath.

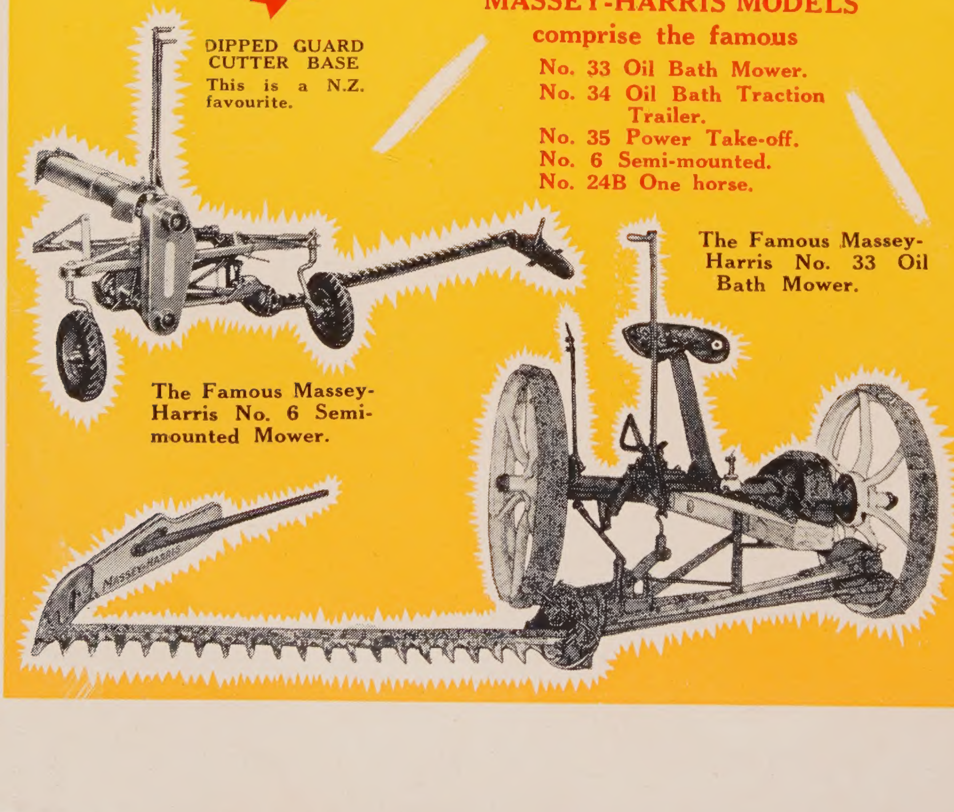
4 **DIPPED GUARD CUTTER BASE**
This is a N.Z. favourite.

5 **LONGER LIFE**
In every respect the Massey-Harris is built to last, built to stand up under toughest cutting conditions.

6 **PRECISION BUILT**
Machine cut pinion gear and bevel gear are precision matched to ensure smooth, easy-running and trouble-free service.

7 **EASIER HANDLING**
Owners everywhere proclaim Massey-Harris as the easiest mowers to handle. Convenient levers act with smartness and thoroughness on all adjustments.

MASSEY-HARRIS MODELS
comprise the famous
- No. 33 Oil Bath Mower.
- No. 34 Oil Bath Traction Trailer.
- No. 35 Power Take-off.
- No. 6 Semi-mounted.
- No. 24B One horse.



The Famous Massey-Harris No. 6 Semi-mounted Mower.

The Famous Massey-Harris No. 33 Oil Bath Mower.

MASSEY-HARRIS CO. LTD.
Head Office: Christchurch.
Branches at: Auckland, Palmerston North and Dunedin.

Agencies Everywhere.

In Association with
P. & D. DUNCAN LTD.

New Zealand
JOURNAL of
AGRICULTURE

SERPENTINE SUPERPHOSPHATE

By G. H. HOLFORD, *Superintendent of Fertilisers, Wellington.*

MORE than half a million tons of serpentine superphosphate has been applied on New Zealand farms. Though its commercial manufacture did not begin until July, 1940, its possibilities as a fertiliser likely to be effective on crops and pastures on a wide range of Dominion soils were being examined a year before the outbreak of World War II, and field experiments were begun in July, 1939.

THE war, with its effect in reducing the country's phosphate supplies, at one period to a third of the normal quantities, speeded up the commercial development of this new fertiliser. At the same time the experience gained from its use during the past six years indicates that, even without the influence of war, it would have found a place in the fertiliser programme.

From the results of official experiments and many farmers' experiences, considered in relation to such factors as alternative fertilisers, supplies and prices in future years, and the modern trend in fertiliser manufacture and use, it is worth while at this time to survey the future of serpentine superphosphate. First it will be of interest to look back to its development and then to study its fertiliser properties in some detail.

History of Development

The first reference that can be found to the use of a material such as serpentine with superphosphate is in work at a leading Russian Scientific Institute for Fertilisers. There in 1932 experiments were being conducted on the value of adding dunite—in essence a high-grade serpentine material—to superphosphate to improve both its physical and its chemical fertiliser properties. The marked improvement in physical characteristics was early demonstrated, and several years' trials showed that on certain soil types the use of the serpentine superphosphate mixture increased crop yields by more than 32 per cent. compared with superphosphate when applied in equal quantities on important farm crops.

HAVE YOU A
Problem
ON YOUR FARM

The answer may be here. The Department of Agriculture are anxious to help you. Take advantage of their Free Bulletin Service. Here are some of the bulletins obtainable FREE.

No.
16—“Grape Anthracnose.”
96—“Lemon Culture.”
135—“Passion Fruit Culture.”
262—“Pampas Grass.”
219—“Home-made Cooler.”
245—“Parasitic Lesions in Lamb Livers.”
263—“Soil Erosion.”
265—“Erecting a Seven Wire Fence.”
118— } “Cleaning of Milking Machines.”
118a— }
207—“The Care of Milking Machines.”
247—“Beekeeping: Establishing a Domestic Apiary.”
172—“Foot-rot in Sheep.”
175—“Careless Handling of Pigs.”
177—“Layout and Construction of Modern Piggeries.”
180—“Cobalt Deficiency in Sheep and Cattle.”
208—“Cereals for Greenfeed.”
226—“Weed Seedlings Controlled by Burner.”
254—“White Butterfly and Diamond-backed Moth.”
269—“Maize Growing for Grain.”

Call or write to your nearest office of the Department of Agriculture for any of the above free bulletins or

Post this coupon

Department of Agriculture,
Auckland, Wellington, Christchurch or Dunedin.

Please send me the bulletins marked above.

NAME ....
(In block letters)

ADDRESS ....
(In block letters)

....

New Zealand Journal of Agriculture
(ESTABLISHED 1910)

TABLE OF CONTENTS—OCTOBER, 1946.

Serpentine Superphosphate—G. H. Holford 289
Radio Broadcasts 302
Farm Dairy Instruction—G. Purvis 303
Developing a Pumice Land Farm—A. T. Shannon and Eva Topping 305
Dry-weather Gardening—J. P. Hudson 315
Studies in Farm Management: A Marlborough Mixed Farm—D. R. Wilkie 319
Value of Nucleus Hives in the Apiary—C. R. Paterson 327
Soil Management in the Orchard—S. Frew 329
The Carrot Crop in New Zealand—A. C. Burgess 333
Winter Pig Feed Crops 338
Management of Growing Poultry Stock—F. C. Bobby 339
Farm Work for November 343
Improved Citrus Types may come from "Sports"—J. E. Hume 344
Bees' Part in Setting of Fruit 345
"Grow More Lucerne"—C. R. Taylor 347
Standard Poultry Mash Ingredients 356
Show Dates 356
Establishing Pastures on Second-growth Burns—E. G. Stainton 357
Steam-operated Bulk and Mother Culture Starter Apparatus .. 359
Build up your Feed Reserves—E. B. Glanville 361
"The Good Neighbour," by Mary 363
Preserving Tomatoes for Winter Use—Eva Topping 366
Colour in the Home—Norma K. Metson 373
Frocks for Very Young Girls—Eva Topping 377
First Aid in the Home—C. Meachen 383

Published by Direction of Hon. B. Roberts,
Minister of Agriculture.

Vol. 73, No. 4. October 15, 1946.

SUBSCRIPTION RATES.

The *Journal* is issued monthly. The subscription within New Zealand, which is payable in advance and includes postage, is 2s. 6d. a year. The overseas subscription is 5s. Subscriptions should be forwarded or paid direct to any office of the Department of Agriculture in the Dominion. Single copies, price 6d., are available from the Department of Agriculture, Box 3004, Wellington.

COPYRIGHT PROVISIONS.

The articles in the *Journal* of the Department of Agriculture of New Zealand are copyright. Proprietors of newspapers and periodicals wishing to republish matter are at liberty to do so, *provided both the Journal and author are acknowledged.*

The Minister of Agriculture does not accept responsibility for any of the private and trade advertisements included in this publication.

In 1937 the Russian experiments were being repeated with favourable results at the Research Institute of the International Superphosphate Association. This institute at Hamburg was supported by two-thirds of the world's superhosphate producers, and a noted group of scientists carried out research on all phases of superphosphate manufacture and use. It was on a visit to this institute in August, 1937, that the writer first secured information on the research work conducted on mixtures similar to serpentine superphosphate.

The use of serpentine with superphosphate merited the attention of leading overseas scientists. That should dispel the idea at one time voiced in New Zealand that serpentine is just road metal used as a "filler" or "make-weight."

Early Work in New Zealand

Study of the Russian literature revealed that the superphosphate used in their experiments was more acid and had a higher moisture content than New Zealand-made superphosphate. Dunite was used by the Russians, but that substance, though found in the Dominion, was too inaccessible for large-scale commercial use. So laboratory tests were made with domestic superphosphate and serpentine (which is accessible and abundant) to see whether the desired chemical reactions occurred.

These early laboratory experiments were conducted by Mr. J. J. S. Cornes, of the Dominion Laboratory, who had studied the Russian experiments and was interested to see whether serpentine would effectively neutralise the acid in superphosphate.

Mr. R. E. R. Grimmett, then chief chemist in the Department of Agriculture, and who had been associated for many years with the study of fertilisers in relation to New Zealand soils, considered that, as serpentine changed the water-soluble phosphoric acid of superphosphate into a "reverted" or citric acid soluble phosphate, a form of serpentine superphosphate offered considerable possibilities for use in New Zealand. The next step was taken in April, 1939, when a commercial sample of a mixture of 3 parts of superphosphate and 1 part of ground serpentine was made at a superphosphate works.

Field Experiments

This product was found to be satisfactory and was used in the first field trials laid down in July-August, 1939, to test out serpentine superphosphate against equal quantities of straight superphosphate applied to crops and pastures.

Serpentine rock. The mottled appearance resembling a snake's skin is responsible for the name "serpentine."

In April, 1940, the Crop Experimentalist reported in the "Journal of Agriculture": "Serpentine superphosphate offers distinct possibilities as a fertiliser in New Zealand. It is a reverted phosphate; its value is therefore indicated in soils which 'lock up' water-soluble phosphate and with crops which are liable to germination injury. A considerable saving in phosphate is possible."

"Journal" on Newsprint

The Department of Agriculture regrets the change in the appearance of the "Journal of Agriculture" as the result of having to print this issue on newsprint. The increasing quantity of paper used for each issue as a result of the steadily-rising circulation has meant that reserves of the high-quality paper generally used for the "Journal" have been temporarily exhausted, and the arrival of supplies ordered has been delayed by shipping difficulties.

However, the Department expects a shipment of better-quality paper to be delivered in time for printing the December issue of the "Journal."

By September, 1941, the Crop Experimentalist, reviewing a wide range of experiments, stated in his summary:—

"1. Present information indicates that serpentine superphosphate should prove a useful fertiliser for pasture topdressing in the heavier rainfall districts of New Zealand. In North Taranaki, Waihi, and North Auckland the new mixture is giving better results than superphosphate.

"2. Serpentine superphosphate has proved a safe reverted phosphate for sowing with the seed of turnips, swede, rape, chou moellier, and other crops liable to germination injury.

"3. Serpentine superphosphate gives equivalent results to those with superphosphate on most of the common farm crops.

"4. Superior physical condition of the mixture makes it easier to sow, more pleasant to handle, safer to store, and less damaging to bags than superphosphate.

"5. It is possible that the magnesium and cobalt content of serpentine superphosphate may be valuable under certain conditions."

Review of Results

Early in 1944, at a conference of technical officers of the Department of Scientific and Industrial Research and the Department of Agriculture, the results of several years' experiments on farm crops and grassland and of farmers' use of serpentine superphosphate were reviewed. The conference issued this statement:

"1. During the past four years some hundreds of official experiments have been conducted on crops and pastures and in most of these equal quantities of serpentine superphosphate and superphosphate have been compared. In a number of instances serpentine superphosphate has shown a definite superiority. Where this is not the case there is evidence of a progressive effect from serpentine superphosphate in some areas more marked than that from straight superphosphate. On all the evidence available the conference believed that weight for weight and over New Zealand as a whole, serpentine superphosphate will give yields equal to those from superphosphate.

"2. Though, unlike superphosphate, which is acid, serpentine superphosphate is a neutral fertiliser, the conference stressed that on lime-responsive soils it is still desirable to carry on a normal liming programme. In some quarters there has been an impression that the use of serpentine phosphate is incompatible with the use of lime. This is quite erroneous; the normal liming practice should be continued.

"3. From a study of the characteristics of Dominion soil types, and because of the chemical and physical properties of serpentine superphosphate, the conference considered that even in the post-war period, when, it is hoped, New Zealand will have adequate supplies of phosphate, there will be an important place for serpentine superphosphate in the manurial programme on crops and pastures."

Wartime Commercial Developments

Only limited quantities of serpentine superphosphate for farm use were made up to 1942. The National Council of Primary Production, set up at the outbreak of war to advise the Government on farming policy and comprised mainly of leading representatives of farmers' organisations, had followed closely the experimental work conducted with the new fertiliser. In May, 1940, this council unanimously resolved that the Government be asked to do all that was necessary to stimulate the manufacture of serpentine superphosphate mixtures.

In October, 1941, the council adopted this resolution: "That in view of the imperative necessity in the national interest of getting the maximum use of our limited importation of phosphate, this council recommends that after the first of January, 1942, no fertiliser with more than 5 per cent. water-soluble phosphate be manufactured save under conditions to be approved by the council." The council had in mind that serpentine would be the principal agent used to revert the water-soluble phosphoric acid in superphosphate.

An outcrop of serpentine rock.

Reasons for Compulsory Use

The entry of Japan into the war in December, 1941, and the cessation of phosphate supplies from Nauru and Ocean Islands intensified the desire of the council for large-scale commercial development of serpentine superphosphate so as to use our limited phosphate supplies more effectively. That was implemented by the Government in the early months of 1942, when manufacturers were requested to make serpentine superphosphate on a substantial scale. The manufacture of serpentine superphosphate was made mandatory in the North Island in September, 1942, and large-scale manufacture of this fertiliser was planned for the South Island. At that time the serpentine deposits in the South Island were under investigation and it was not practicable then to convert all superphosphate made there into serpentine superphosphate.

Mr. A. H. Cockayne, then Director-General of Agriculture, explained the Government's action in these words:

> "What every thinking farmer must be asking himself is: What is the real objective behind the Government's decision? This can be answered in quite a few words. The objective is to enable primary production to be increased, it being considered—and I believe correctly—that increased primary production is intimately concerned with the whole success of our war effort. Increased primary production depends very largely on adequate labour on the farm and on adequate supplies of fertiliser.
>
> "As all producers know, our supplies of fertilisers, particularly phosphatic ones, have been reduced to a point that makes even the maintenance of production precarious. In the North Island this year the manufacture of superphosphate will not much exceed 150,000 tons, barely one-third of the amount used in each of the two years before rationing. Anything that can be done to increase the effectiveness of this tonnage is therefore of national importance.
>
> "The work of the Department has shown during the past three years that 75lb. of superphosphate converted into 100lb. of serpentine superphosphate will do the work of 100lb. of straight superphosphate. There have been so few exceptions to this generalisation that they can be viewed as negligible, and in no case has it been shown that 100lb. of serpentine superphosphate is inferior to 75lb. of superphosphate. In many cases 100lb. of serpentine

superphosphate has been demonstrated as distinctly superior to 100lb. of straight superphosphate. In other words, the use of serpentine superphosphate instead of superphosphate increases the effective fertiliser ration of the farmer by 33⅓ per cent., and in the North Island alone places in the hands of farmers an equivalent of 50,000 additional tons of superphosphate.

"No wonder the Government, conscious of increased primary production being essential, and on the advice of the Department and of the Primary Production Council, made the decision that all superphosphate manufactured in the North Island had to be converted into serpentine superphosphate.

"It is hoped to be able to go further in the future and follow the same practice in the South Island, but unfortunately this cannot take place immediately, as adequate supplies of ground serpentine are not yet available in the south. The case for serpentine superphosphate against straight superphosphate is clear and definite, and even opponents of its universal use would not be prepared to say that such action does not very appreciably increase the efficiency of our available supplies of superphosphate."

Opposition Aroused

So the compulsory use of serpentine superphosphate came to pass in the North Island for the reasons stated by the Director-General and on the unanimous recommendation of the National Council of Primary Production. This action aroused opposition, and in Mr. Cockayne's words: "It has not been received with universal favour. This has been in the main the result of non-recognition of essential facts, and probably also in certain quarters because such action by the Government would not be beneficial from the individual business aspect."

The anxiety of many farmers who had no personal experience with the new fertiliser and were not in close touch with the results of field trials can be easily understood. This anxiety was not lessened by a spate of inaccurate statements published about both serpentine and serpentine superphosphate. The unsatisfactory condition of a lot of the mixture delivered in the early months of its large-scale manufacture played into the hands of those opposed to the Government's action.

Quarrying serpentine rock.

The large-scale manufacture of both superphosphate and serpentine superphosphate was fully considered, but practical works problems made that very difficult. It had to be one or the other, and compulsory serpentine superphosphate was deemed to serve the national interests best. By cutting off supplies of alternative phosphatic fertilisers—basic slag and North African phosphates—the enemy had in effect compelled New Zealand farmers in the early years of the war to use superphosphate, and that in small quantities. The question was whether this compulsory use of superphosphate could be countered in any way.

By the addition of serpentine, a domestic material, 3 tons of superphosphate was converted into 4 tons of serpentine superphosphate, each ton of which, according to experimental trials, was not inferior in fertilising properties to each ton of straight superphosphate when this gave good results, and it was evidently better on soils where basic slag and North African phosphate were favoured; so large-scale production of serpentine superphosphate appeared to be the wisest step in all the circumstances. Such a course would also conserve bags, because unlike superphosphate the new fertiliser did not injure them chemically. At that time it was not known whether the bag supply from India might not be seriously affected by enemy action. Saving bags was therefore prudent.

Farm Production Well Maintained

This policy was implemented nearly four years ago, and it is reasonable to ask how it has turned out in practice. In one respect there was some disappointment. That was in the condition of a percentage of the serpentine superphosphate delivered to farmers because of some of the serpentine rock not being sufficiently finely ground and the mixture not being adequately screened, leaving large lumps, some big enough to cause trouble in drilling. However, these troubles, not unexpected in wartime, developed when shortages of suitable plant and equipment presented problems; they have now been overcome, but possibly not without leaving a prejudice toward the new fertiliser with some farmers. This will be overcome only by their having experience with the present-day superior product.

North Island farmers applied serpentine superphosphate almost exclusively for two years, so it was difficult for them to evaluate its fertilising ability in comparison with ordinary superphosphate, particularly as the quantity applied was smaller than in the pre-war and early war years. What is known is that in 1943 and 1944, when the North Island applied the lowest wartime tonnage of phosphatic fertiliser, and nearly all of it as serpentine superphosphate, the over-all volume of farm production was exceedingly well maintained without help from specially-favourable weather.

Some two years ago transport difficulties—mainly shortage of railway trucks—prevented sufficient serpentine rock reaching the superphosphate works to enable full-scale manufacture

Champions —
reared on Vite-ADee
Vite·ADee
(DOUBLE STRENGTH)
CONCENTRATED
FISH-LIVER OIL
and Blended Oils
FOR LIVESTOCK
ONE GALLON WHEN PACKED
MANUFACTURED FOR
W. & R. FLETCHER (N.Z.) LTD.
WELLINGTON AND AUCKLAND
POULTRY
SHEEP
DOGS
HORSES

Undefeated in Calf Groups throughout the Waikato 1946 Show Season

THIS bonny group of calves, entered by A. Moreland & Sons of Cambridge, won points prizes at four Waikato Shows, 1945/1946—at Hamilton, Cambridge, Te Awamutu and Matamata. And in addition, individuals of the group won many awards. Vite-Adee prevents nutritional scouring and builds stamina, through perfect health—as the winning points for Moreland & Sons' calves must show.

Write to Nutrition Department,
W. & R. Fletcher (N.Z.) Ltd.,
G.P.O. Box 663, Wellington.

V.9.24

of serpentine superphosphate. That position still obtains and it has limited the tonnage of the mixture manufactured. All the new fertiliser made in recent years has been sold readily, and farmers have complained of their inability to get supplies.

Arrangements have been made by which it is hoped that greater quantities of serpentine will reach the works each month, and with the installation of modern drying and grinding equipment to treat the serpentine rock, and to process serpentine superphosphate satisfactorily, it will be interesting to see what the future holds for this recently-developed fertiliser.

Future Possibilities

Experimental work with serpentine superphosphate began before the war, which suggests that it had possibilities under peacetime conditions and was something more than an expedient to help out the wartime phosphate shortage. If serpentine combined with superphosphate can be regarded as a "superphosphate equivalent," then the 150,000 tons of serpentine used in the war years was equal to one-third of the annual superphosphate tonnage applied in 1939—a substantial contribution to the wartime fertiliser programme.

But it is now 14 months since VJ day, and it is natural to ask what part the new fertiliser is destined to play in the post-war years. At present under the rationing scheme farmers can obtain 27cwt. of serpentine superphosphate for each 20cwt. of superphosphate in their allocation. After rationing ends there will be no such difference. It is hoped that then there will be ample rock phosphate for a full-scale superphosphate manufacturing programme. Some years may elapse before annual shipments of basic slag, North African phosphates, and guano reach New Zealand in tonnages equal to those received just before the war—about 110,000 tons—and landed costs will probably be higher.

These facts must be kept in mind when considering the future possibilities of serpentine superphosphate. The tonnage produced will ultimately depend on farmers' demands, which will be determined by the degree to which the physical condition, fertilising properties, and prices of the new fertiliser satisfy the users.

Modifying of Superphosphate

For more than 100 years superphosphate has maintained its position as the world's most widely-used fertiliser. The native phosphate rock, even when finely ground, has only a limited use because of the slow availability of the phosphate in this form. This is unfortunate, as the Nauru and Ocean Islands product, for example, contains 84 to 86 per cent. of phosphate; if this was effective as plant food when finely ground, small dressings would suffice for manuring. When superphosphate is made by the addition of sulphuric acid to the ground rock phosphate, the phosphate content is reduced to 44/46 per cent. Despite intensive research, no other method of making an effective phosphatic fertiliser from rock phosphate has yet been developed on a scale likely to threaten the position of the cheaply-made superphosphate. But of recent years there have been important developments along the lines of modifying or changing this fertiliser after its manufacture to improve both its physical nature and its fertilising properties.

Why these changes are considered desirable has been stated recently by European authorities, who as leading superphosphate manufacturers cannot be classed as biased against this fertiliser. In an article in a leading British technical journal, "The Chemical Age," two prominent Swedish superphosphate manufacturers, Messrs. Sven Nordengren and Hans Lehrecke, fully discuss certain weaknesses and suggest methods by which superphosphate can be improved.

After commenting on types of phosphatic fertilisers other than superphosphate, and on the main developments in superphosphate manufacture to improve its quality, the Swedish writers state:

> "Despite all these improvements, it must be admitted that a further improvement of the product is desirable. Though it is pulverised and sieved, the difference in particle size is considerable, and its plasticity and stickiness make distribution by spreading machines difficult. When it is stored solidification or caking cannot be avoided, and bags are destroyed in time because even a seasoned product contains a certain amount of free phosphoric acid. These disadvantages of superphosphate cannot be ignored.
>
> "It has long been accepted that the water-soluble phosphoric acid of calcium superphosphate reacts on the soil with great rapidity. Heavy and acid soils react in this respect more rapidly than light and alkaline soils. It has been found that if superphosphate is spread on the surface of the soil without being forked in, the phosphoric acid will penetrate only 1 to 1½in. into the soil.
>
> "The cause of this fixation is the formation of water-insoluble compounds between the free phosphoric acid or the monocalcium phosphate and basic matter in the soil such as iron, alumina, and lime. The result is that the water-soluble compound of the superphosphate has little or no direct fertilising effect.
>
> "The fixation and transformation to insoluble phosphate compounds is more intensive in acid soils, because iron and alumina are present in more reactive form than in alkaline soils. Even in neutral or alkaline soils, having little if any iron, the fixation of the water-soluble phosphoric acid occurs fairly rapidly, although more slowly than in acid soils.
>
> "That the phosphoric acid content of superphosphate is constantly fixed in all soils is shown by the fact that the quantity of phosphoric acid absorbed by plants during the first year seldom exceeds 40 to 50 per cent. of the total quantity used, and may even be as low as 15 to 25 per cent. In acid soils it is often lower than the latter figure.

"Obviously," they conclude, "a modern fertiliser should be more efficient than this."

Increasing Fertilising Effect

The writers then say that the industry must consider methods of increasing the fertilising effect of superphosphate by improving it physically and chemically. (A method of "granulation" or making fertilisers into "pellets" is discussed; it will be referred to in a later article in the "Journal.")

Speaking of modifying superphosphate chemically to ensure that more of the phosphoric acid it supplies goes to satisfy the need of plants rather than the greed of soils for this plant food, the European authorities state:

> "What is possible here is to change the water-soluble content partly or wholly to citrate solubility. Citrate-soluble phosphoric acid will not revert to insoluble phosphates so rapidly or even to the same extent as the water-soluble, because the citrate-soluble compounds have only a small power of motion in the soil and do not react with its iron and alumina compounds as readily as the water-soluble compounds. It is known that fertilisers containing phosphoric acid in a citric-soluble form give good fertilising effect.
>
> "The greater part of the soils under cultivation in many European countries are deficient in phosphoric acid, and their phosphoric acid requirements cannot be met by ordinary superphosphate because of the fixation of phosphoric acid in the soil. **Consequently the employment of ordinary superphosphate does not pay."**

FIRST AID ON THE FARM

Give your stock
COMPLETE PROTECTION!

ANTISEPTIC
SURE-OL
DISINFECTANT
NON-IRRITANT
NON-POISONOUS

There are a hundred and one uses for SURE-OL, which can be adapted successfully to any farm (or home) requirement where the demand is for a disinfectant which is absolutely non-poisonous, and which possesses outstanding healing qualities. SURE-OL contains no carbolic acid, but in effect is actually stronger. SURE-OL is non-corrosive, non-irritant; safe and sure under all conditions.

SURE-OL

THE *NON-POISONOUS* DISINFECTANT

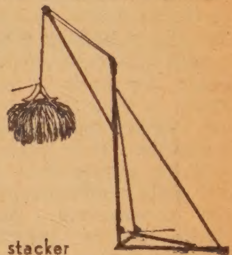
SURE-OL is available in 4oz. and 16oz. (Bottles); ½ Gallon, 1 Gallon and 4 Gallon (Containers).

Distributors for New Zealand:

LEVIN & CO. LTD. - WELLINGTON

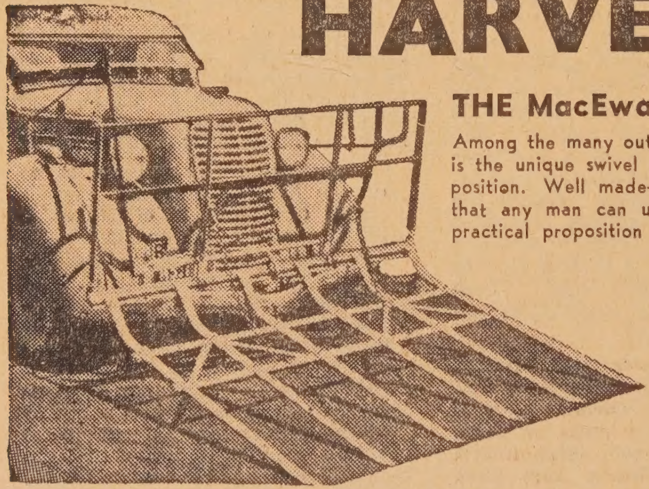
Obtainable from Stock and Station Agents and all Wholesale Merchants.

AIDS TO SPEEDY HARVESTING



THE MacEwan ALL STEEL STACKER

Among the many outstanding features of this truly remarkable stacker is the unique swivel pulley designed to enable hay to be picked up from any position. Well made—perfectly balanced—so simple to assemble and operate that any man can use it. The MacEwan Stacker is constructed of steel. A practical proposition for every farmer.



TUMBLER SWEEP

Particularly suitable for small farms, the MacEwan Tumbler Sweep is strongly constructed of N.Z. hard wood and fitted with eight iron-shod wooden teeth. Invaluable for quick harvesting on a small scale, the Tumbler plays an essential part in modern farming.

THE MORRISON AUTO-LIFTING SWEEP

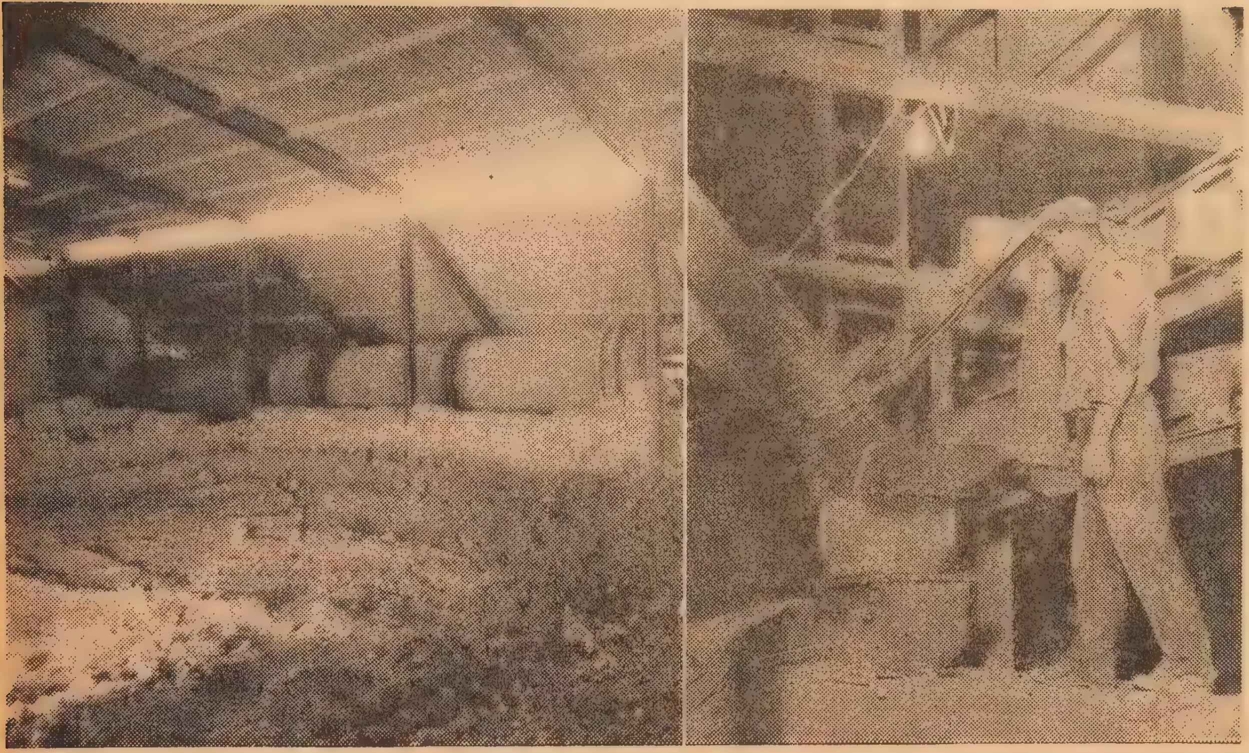
Equipped with specially constructed spring steel teeth, the Morrison Auto-Lifting Sweep can be used to full advantage on all types of soil. Simple to use, this Sweep can be fitted to any car, truck or tractor. Another feature in this time and labour saving Sweep is a lift to raise the teeth off the ground whenever required.

WRITE
TODAY
FOR
FULL
DETAILS

MacEwans
LIMITED

HEAD OFFICE: PENROSE, AUCKLAND, and at WARD ST., HAMILTON. Agents at Pukekohe, Te Puke, Thames, Tauranga, Whangarei and Taumarunui. Messrs. J. B. MacEwan & Co. Ltd., Wellington, Palmerston North, Carterton, New Plymouth, Stratford, Hawera, Opunake. Agents: Messrs. Levin & Co. Ltd., Blenheim; Messrs. Reid & Gray Ltd., Dunedin, Balclutha, Gore and Invercargill.

SERPENTINE SUPERPHOSPHATE



[Sparrow Industrial Pictures photo.

Drying and grinding serpentine rock.

Superphosphates as made in Europe and in New Zealand are not dissimilar in characteristics, and discussions with the Soil Survey Division of the New Zealand Department of Scientific and Industrial Research indicate that over wide areas the Dominion's soil types are such that "fixation" or "locking up" of water-soluble phosphoric acid as applied in superphosphate is possibly more severe than in European soils, strongly indicating the use of a citric-soluble phosphate in New Zealand.

As there is no phosphate in serpentine rock, the mixture serpentine superphosphate has a lower phosphate analysis than superphosphate. The merits of serpentine superphosphate are therefore in changes in the mixture which can compensate for its lessened phosphate content.

Characteristics of Serpentine Superphosphate

Serpentine superphosphate is made by mixing one part by weight of finely-ground serpentine with three parts by weight of hot moist superphosphate as cut out from the dens at the factory. Experimental quantities of suitable analysis have also been produced by mixing the ground serpentine with cold matured superphosphate and adding a percentage of moisture to provide suitable conditions for chemical reaction.

It cannot be stressed too strongly that to make a true serpentine superphosphate there must be chemical reactions as a result of the mixing of the two materials, and a certain time is necessary for this to be effected, so that a low percentage of water-soluble phosphoric acid is attained in the mixture.

To regard the addition of serpentine to superphosphate as a "filler" or "make-weight" is entirely erroneous. At one time in New Zealand sand was added to superphosphate to reduce the manufactured grade to 36/38 per cent. (expressed as tricalcic phosphate), which was the standard quality at that time. As sand does not react chemically with superphosphate, it was a mere "filler" or "diluent." Serpentine is a magnesium silicate, and when chemically reacted with superphosphate both the magnesia and the silica it contains play desirable parts in fertiliser efficiency.

Less Phosphate "Fixation" in Soil

In the chemical reaction mentioned the magnesia (of which serpentine contains from 30 to 35 per cent., according to the quality of the rock) combines with the water-soluble phosphoric acid of superphosphate to make a dimagnesium phosphate, and there is also a development of water-soluble magnesia. This dimagnesium phosphate is what is termed a "reverted" phosphate. It is citrate soluble, and overseas research has demonstrated the high efficiency of phosphate in this form from the point of view of its utilisation by plants. This is most important and comes about because in the dimagnesium form the phosphate is much less subject to "fixation" or "locking up" into an unavailable form for plant use by combination with iron and alumina in the soil.

The outstanding problem with phosphate manuring is the increasing of the proportion of the phosphate recovered by plants. For instance, in 100lb. of superphosphate there is 20lb. of phosphoric acid, but on acid soils possibly not more than 4 to 6lb. will be recovered by growing plants, the remainder being "locked up" in insoluble forms in the soil.

In 100lb. of serpentine superphosphate there is a minimum of 15lb. of phosphoric acid—5lb. less than in superphosphate; but as much and more is likely to be recovered by plants than from the 20lb. in superphosphate because a greater percentage is recoverable.

As most of the phosphoric acid of superphosphate is already combined with magnesium in serpentine superphosphate, it is then much less subject to "fixation."

Importance of Magnesia

A percentage of water-soluble magnesia is developed in the manufacture of serpentine superphosphate. A study of modern literature on fertilisers shows that magnesium is being recognised increasingly as an important element in plant and animal life. As the only metal in chlorophyll, the green colouring matter of plants, it holds a key to the plant world, and so to life itself, on this earth.

A leading American soil scientist states: "Magnesium is instrumental in bringing about the greater effectiveness in the calcium use of plants in a manner much as calcium—applied as lime—is apparently needed to make nitrogen and phosphate more effective in plant functions."

Professor Truog, a noted American soil scientist, writes: "Magnesium acts as a phosphate carrier in plant metabolism. It is interesting to note that basic slags containing the highest percentage of magnesium are the most effective as fertilisers."

The United States Department of Agriculture states: "If the supply of magnesia in the soil runs low the plant cannot make good use of the other plant foods. Magnesium is removed by crops in amounts comparable to the removal of calcium, phosphoric acid, potash, and sulphur."

It is apparent that a sufficiency of magnesia in soil available for plant use is quite important. The magnesium content of the principal soil types in New Zealand has not yet been fully determined. What is known already is that there is a deficiency of magnesia in some areas which must be made good by fertilisers if satisfactory crops are to be grown. This applies to tobacco and fruit crops in parts of Nelson.

Up to the time serpentine superphosphate was used only insignificant quantities of magnesia were applied to New Zealand soils in fertilisers in contrast to millions of tons of calcium in lime and superphosphate. Yet it is known that magnesia leaches out of soils and is used up by plants and animals.

Loss of Potash and Magnesia

Another important point is that the continued use of superphosphate lowers the magnesium levels of soils. Here is a statement on the question made a few years ago by Sir Theodore Rigg, Director of the Cawthron Institute, Nelson:

"The continued use of superphosphate cannot but fail to have an important effect on the status of potash and magnesia in the soil unless applications of fertilisers containing these plant foods are made from time to time. Officers of the Soil Survey Division have examined the exchangeable potash and magnesia contents of Waikato soils both with and without phosphate treatment. They found that definite losses in both potassium and magnesium were associated with the large continued use of superphosphate as a topdressing. Their data indicated that, though a considerable proportion of the potash losses could be accounted for in products sold off the farm, this was not the case with magnesium. There can be little doubt that the large amount of gypsum contained in superphosphate has forced magnesium into the soil solution, resulting in considerable loss by the leaching action of the rain. In both cases, the losses of potash and magnesia over a period of years are comparatively large, and undoubtedly the time must come when attention must be paid to the use of these plant foods in fertiliser programmes."

It has been suggested that the more effective action of basic slag compared with superphosphate in some areas is possibly the result of the high magnesium content of slag as well as difference in the type of phosphate. There is virtually no magnesia in superphosphate. It is known that low magnesium content in the blood is associated with "grass staggers" in cattle, and magnesium is injected in the treatment of this complaint.

What influence soil applications of magnesia in serpentine superphosphate are likely to have on plant and animal life in New Zealand is for the future to determine, but on present evidence there are grounds for believing that it may not be unimportant. Some of New Zealand's leading agricultural scientists consider the fact that it supplies available magnesia is alone strongly in favour of the wide use of serpentine superphosphate in the Dominion.

Colloidal Silica Helps Phosphate Uptake

Silica is present in serpentine to the extent of some 30 per cent., and in chemical reaction with superphosphate a proportion is converted into colloidal silica. When added with fertiliser to the soil, this is considered by leading soil scientists to play a significant role in assisting the uptake of phosphates by plants. In the original Russian experiments with the form of serpentine superphosphate used there the part played by colloidal silica was considered the most important of all factors in the higher crop yields obtained by this fertiliser in comparative trials with superphosphate on farm crops. The head of the research station of the International Superphosphate Association said at a meeting in Europe: "It was proved that silicic acid promoted the action of the phosphoric acid added; i.e., that in the presence of adequate quantities of colloidal silicic acid phosphoric acid could be absorbed to a greater extent. The increase in yield thus obtained by applications of colloidal silicic acid might be considerable."

It seems possible that colloidal silica when added as in serpentine superphosphate may enter into combination with iron and alumina in the soil and so to that extent prevent these bases from "locking up" some of the phosphoric acid added in fertilisers and allow more of it to become available to plants.

"Trace Elements" Added

As well as magnesia and silica, serpentine contains small quantities of so-called "trace elements," cobalt, nickel, zinc, and manganese. A deficiency of cobalt that is responsible for "bush sickness" in stock in parts of New Zealand is made good by the use of cobaltised superphosphate or cobaltised serpentine superphosphate. The amount of cobalt applied in the usual dressings of serpentine superphosphate is probably too small to counter "bush sickness" on affected country, but the steady application of even limited amounts may, over a period of years, have the effect of improving the cobalt content of soils and may possibly prevent those on the margin of cobalt deficiency from deteriorating into the "bush-sick" class. Only long-term experimental work can determine this possibility. At least in one area of New Zealand the addition of nickel gave improved results with stock, above those secured by cobalt additions. Deficiencies of zinc and manganese in the soil have all been found to affect normal plant growth in some parts of the world, but whether there is a deficiency of these in New Zealand has not been determined.

At this stage it is prudent not to lay too much emphasis on the presence of the above "trace elements" in serpentine, particularly as they are in very limited amounts, but there is always the possibility that over a period and in some areas one or more of them may be found useful after long-term manuring with serpentine superphosphate.

Chemists advise that there is no element in serpentine that is likely to be harmful when the new fertiliser is applied in substantial amounts per acre over a long term.

Benefits of Serpentine Admixture

Summarising, the magnesia of serpentine brings about these desirable changes for the fertilising of crops and pastures:

It converts the water-soluble phosphoric acid in superphosphate largely into dimagnesium phosphate—a reverted phosphate less liable to "fixation."

Magnesia is supplied in a form suitable for plant nutrition, and the case for its use on New Zealand soils seems well founded.

Colloidal silica is formed, and this, soil scientists state, helps the uptake of phosphates by plants.

Useful trace elements are added, especially cobalt, but no judgment of their value is yet possible.

It is quite possible that further experiments on some soil types in New Zealand may reveal that there is no advantage in replacing straight superphosphate with serpentine superphosphate, and that the lower percentage of phosphate in the latter is not compensated for by the change in the phosphate from water soluble to citric soluble, nor by the addition of the new materials, i.e., magnesia, colloidal silica, and "trace elements," the last mentioned in very small amounts.

But on present knowledge of soils and fertilisers it would appear that the regions where superphosphate used straight is likely to be more effective are those having low rainfall and light soils, and these are a relatively small percentage of our farming areas. Over the greater area used for farming in the Dominion the rainfall is such that a citric acid phosphate as in serpentine superphosphate should be more efficient because of the tendency of such soils to be acid and to be medium to high in degrees of phosphate "fixation." Also in such parts there would be a leaching of magnesia, and in time the need would arise for its replacement.

[*Sparrow Industrial Pictures photo.*

Free-running serpentine superphosphate.

Improved Physical Condition

The tendency of superphosphate to "cake" and in time to set hard is known to all users. As roughly half its weight is gypsum, or plaster of Paris, this weakness is inherent in the product. So too is the fact that its acid nature in time destroys bags. These points tend to raise the cost factors in superphosphate manufacture, distribution, and use. The farmer, especially in certain weathers, often experiences difficulties in spreading evenly by drill or by hand a fertiliser that tends to cake. When it sets hard in storage the difficulties are increased, and often the superphosphate cannot be made into a suitable condition for spreading without mechanical treatment. On top of this, when some types of superphosphate are stored for a period there is serious damage to bags. At present new fertiliser bags cost £1 a ton when 12 bags are used to the ton, as generally is the case. Of particular interest to farmers is the fact that with a storable fertiliser it is possible to secure supplies ahead and ensure their being on hand and spreadable when required. This is important for crop sowing and, though possibly not as fully appreciated as it might be, for topdressing pastures.

The stock-carrying capacity of many farms can be influenced by the times of fertiliser applications. It is a long time since transport allowed all farmers, especially in the North Island, to secure their full supplies of fertiliser for topdressing in the autumn—the period so important in providing grazing in the winter and early spring. Some farmers consider that 1cwt. an acre applied in March-April is worth two applied in mid-winter.

A well-made serpentine superphosphate eliminates all these weaknesses associated with straight superphosphate. The new fertiliser is free running and does not set hard, is non-acid, and does not injure bags even after long storage.

Preventing Injury to Seeds

Especially in districts of low rainfall, but even in others where a good dressing is applied with seed, the detrimental effect of superphosphate on seed germination, especially of cruciferous crops such as turnips, swedes, rape, kale, and chou moellier, is well known, and its extent has been demonstrated in official trials. Such injury can mean financial loss, especially if the weather does not favour resown crops.

All official trials have shown, and farmers' experiences have confirmed, that serpentine superphosphate is a safe, reliable fertiliser for sowing with seeds, especially those liable to germination injury when sown with superphosphate. It does not burn the operator's skin or cake on working parts of the drill. These points, added to others mentioned, are strongly in favour of the new fertiliser, but if they are secured at the expense of its fertilising efficiency on crops and grassland, they would not fully justify its large-scale manufacture and use.

[*Sparrow Industrial Pictures photo.*

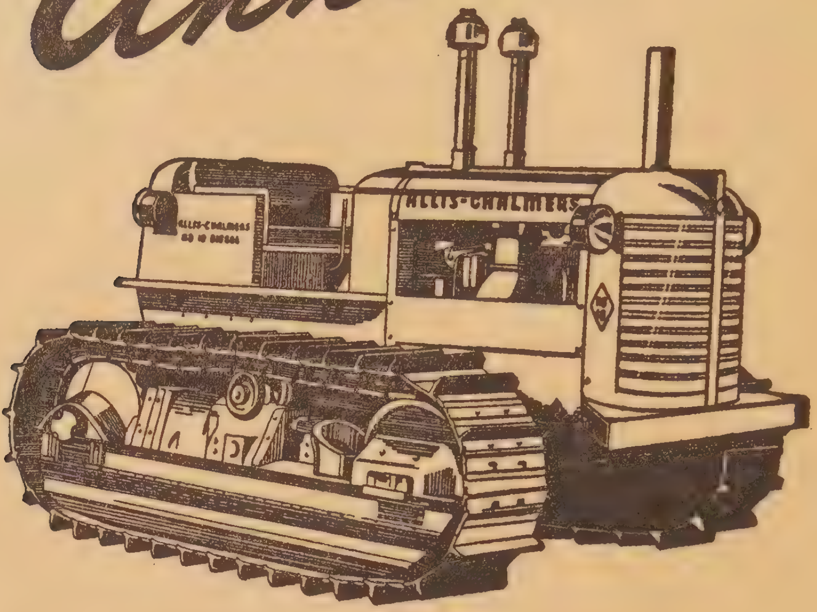
Manufactured serpentine superphosphate.

Farmers' Attitude Changing

A considerable number of official trials on crops and grassland has indicated that weight for weight serpentine superphosphate is on the whole as good as, and in certain soil types better than, superphosphate. Further experiments will be conducted over a wider range of areas than was possible in wartime. A better evaluation will then be possible of the relative efficiency of these two fertilisers and of others applied under comparable conditions. Time also will bring valuable data from farmers' experience. Wartime conditions with restriction on fertiliser applications and for periods the availability of only one type of fertiliser have made it extremely difficult for many farmers to gain experience from which a true judgment can be made in comparing one fertiliser with another. Very limited tonnages have so far been made in the South Island.

Last year the demand by farmers was possibly greater than the supply, and that may be the case this year. There are indications that the attitude of many farmers, at one time adverse to this new fertiliser, is changing in its favour. It already has many strong supporters, a number of them large users of fertilisers, but some still re-

ALLIS-CHALMERS *Announce*



IMPROVED MODELS

Allis-Chalmers Tractor Models HD.14, HD.10, HD.10.W, HD.7, and HD.7.W, are now better performers than ever, with longer tracks giving ten per cent. increase in ground contact. More track on the ground means greater pull! Speeds yarding, skidding and road-building . . . assures better footing on steep inclines and on every type of soil. Operators will like its smoother, easier riding. Owners will welcome increased work capacity.

Enquire now about this mighty hauler and earth-mover from:

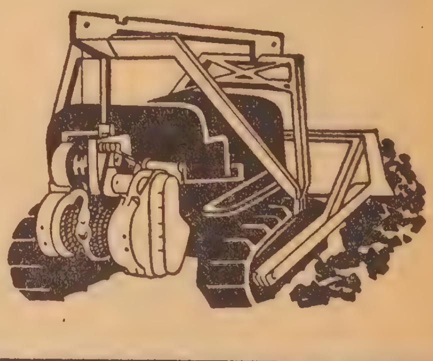
North Island Distributors for Allis-Chalmers:

The Dominion Motors Ltd.

LONGER TRACK

Gives You

IMPROVED TRACTION
IMPROVED BALANCE
IMPROVED RIDING
IMPROVED PERFORMANCE!



gard it unfavourably for one reason or another. Few have shown it to be less efficient than superphosphate used in equivalent quantities, but it is possible that there are areas in the Dominion where that will be demonstrated.

Despite what must be considered limited experience from the use of small quantities an acre, and with virtually no opportunity for comparisons with other phosphatic fertilisers under identical conditions and over a term of years, the following observations from a number of users of serpentine superphosphate are of interest:—

Use on Grassland

Though under some conditions a little slower in action, serpentine superphosphate in the opinion of many has given a more even and prolonged growth during the year than straight superphosphate, and the sustained effect—that is from a dressing not repeated for two or three years—has been noticeably better. This has suggested the suitability of the new fertiliser on hill country which it is practicable to topdress only at intervals of two or more years. The fact that the phosphate in serpentine superphosphate is in a form less liable to "locking up" by the soil readily explains these results.

Some users have commented on the preference shown by stock for areas treated with the new fertiliser. A few go as far as to consider that stock are healthier, but it would seem too soon for results of this kind.

An improvement in stock health as a result of a number of years of consistent use of serpentine added to superphosphate has been predicted by a leading New Zealand agricultural chemist. It will be interesting to watch for such indications.

Similarity to Super-Slag

Other points noted are a marked stimulation of clover growth and a lessening of moss in pastures—as one farmer suggested: "Just as I got with basic slag."

It is probably not fully realised that serpentine adds to superphosphate two constituents it does not possess and which are present in basic slag—magnesia and silica. In a report of trials carried out at the world's most famous fertiliser research station, Rothamsted, England, this statement is made: "The results from serpentine super were closely similar to a mixture of three parts of superphosphate to one of basic slag."

Official trials on grassland in areas in New Zealand where basic slag is popular have given similar indications. In such districts, with slag unavailable during the war and probably limited in amount and high in price for years to come, a fertiliser closely similar to a super-slag mixture is likely to gain popularity. Some years ago official trials proved this mixture to be better than superphosphate or basic slag used singly. Many farmers, because of the difficulty of mixing the two, topdressed pastures with one of these fertilisers in alternate years and found that profitable.

All the evidence available strongly suggests that on land were basic slag and North African phosphate gave good results in the past serpentine superphosphate will do well. But unlike these two fertilisers, and because of its superphosphate content, it will also be effective on lighter and drier soils not suited to slag and ground phosphates. The price of the new fertiliser should be lower than either for some years at least.

Will Smaller Per Acre Dressings be Possible?

As the phosphate content of our soils is built up by manuring, there is every indication that it may be possible to maintain satisfactory yields of crops and pasture by comparatively smaller quantities of annual applications, especially if the phosphate applied is in a form such as in serpentine superphosphate, since its phosphate is likely to remain in a more effective form for plant use over a lengthy term, in contrast to that in superphosphate, where the phosphate not utilised soon after application is rendered unavailable, possibly for an indefinite period.

The good results noticeable over the past few years from small per acre dressings of serpentine superphosphate, particularly where they have been applied regularly year by year, do warrant expectation of economies in manuring as time goes on. Field experiments and farmers' experience can alone determine such matters.

Value on Crops

The value of serpentine superphosphate on cruciferous crops because it avoids germination injury is well known. Farmers have reported not only excellent brairds but good crops of roots and forage crops from the use of the new fertiliser, and everything points to it gaining in popularity for sowing with these types of crop. When the Department of Agriculture grew extensive areas of vegetables for the Armed Services serpentine superposphate was widely used and gave full satisfaction on a wide range of crops.

So far only limited quantities of the fertiliser have been used in the South Island, the main cereal-growing area, so it is not possible to evaluate possibilities there, but the official trials for several years showed that generally it was not less effective than superphosphate on wheat, oats, and barley.

Costs Favour Serpentine

Today serpentine superphosphate sells ex works in the North Island at £4/3/- a ton, or 3/- more than superphosphate. In the South Island the price is the same as lime-reverted superphosphate, £4/9/6 a ton at free delivery points. In the North Island a difference of less than twopence a hundredweight may be considered of little consequence, but it is important to appreciate the position in terms of true costs. Superphosphate has been maintained at its 1939 price by subsidies and no subsidy was paid on serpentine rock during the war. Without subsidy to either product the selling price of serpentine superphosphate in recent years would probably have been nearly 30/- a ton lower than that of superphosphate.

The subsidy on raw materials alone (rock phosphate, sulphur, and nitrate of soda) to keep the prices at the September, 1939, level will reach nearly £3,000,000 for the current rationing year. A large percentage of this sum is debited to the stabilisation accounts of the meat and dairy industries.

When serpentine is mixed with superphosphate in the works, the true, unsubsidised cost of the superphosphate is from two to three times that of serpentine, and it is likely to be much higher for some time to come, even when phosphate costs fall.

Mention has been made of certain similarities between serpentine superphosphate and a mixture of basic slag and superphosphate in proportions of one to three. At the outbreak of World War II basic slag was selling at over £8 a ton—twice the price of superphosphate. This year's shipment of basic slag—the first for seven years—will sell at about three times the price of superphosphate, despite a subsidy on the basic slag price equal to that paid on the raw materials contained in superphosphate. Here again the price factor is in favour of serpentine superphosphate when compared to a 3 to 1 superslag mixture.

Serpentine Superphosphate and Lime

In a later article in the "Journal" the importance of liming will be discussed, but one point can be mentioned here: The desirability of using lime to the maximum extent where it fills the role of a phosphate economiser in that phosphate "fixation" is minimised. This need is now of greater significance in view of the higher real costs of phosphatic applications compared with the pre-war years.

SERPENTINE SUPERPHOSPHATE . . .

But economic factors rule out the use of lime over wide areas of New Zealand—much of the hill country and districts a long distance from rail. In the absence of lime applications it is reasonably certain on present evidence that serpentine superphosphate will make for a better phosphate utilisation than if superphosphate is used. Even where lime can and will be applied, in most areas it can go only part of the way to minimising phosphate "fixation" when water-soluble phosphoric acid is used, as in superphosphate. So it is most likely that both lime and a citric-soluble type of phosphate—as in serpentine superphosphate—will be found necessary for the highest returns in crops and stock in many districts where lime can be used.

As a means of improving soils physically and chemically for the more effective use of superphosphate, lime has already proved itself over more than half a century's use in the Dominion; there is only a few years' experience with serpentine superphosphate. To convert the present year's tonnage of superphosphate into serpentine superphosphate would require 200,000 tons. It is true that there are unlimited supplies in accessible deposits, but the quantity of serpentine available at works will be limited in the first place by inadequate transport, no matter what the requirements are. On a 600,000 tons superphosphate basis, the approximate quantity it is hoped to make in the next 12 months, it would require 100,000 tons of serpentine to convert half the tonnage to serpentine superphosphate, thus making 400,000 tons of the new mixture and leaving 300,000 tons of straight superphosphate. On present evidence this tonnage of serpentine superphosphate, if used in the areas most suited to it, should give better results than an equal tonnage of superphosphate. Under present conditions and provided there were no limitations to distribution, it should be possible to use 100,000 tons of serpentine a year at the works, but to manufacture 100,000 extra tons of superphosphate would present a real problem.

It has been stated that it will cost £500,000 to erect and equip a new works to make 100,000 tons of superphosphate a year. The cost per ton of superphosphate made would be much higher than the cost of 100,000 tons of "superphosphate equivalent" secured by mixing serpentine with superphosphate in the 1 to 3 mixture.

It is significant that in the North Island, which has the most experience of the use of serpentine superphosphate, all the works have now established plant to process this fertiliser on a very substantial scale and to make a high-class product. This suggests faith by the companies in its future.

Need for Economy in Phosphates

These facts should be borne in mind: New Zealand has no worthwhile phosphate deposit and the British Empire generally has limited phosphate supplies. Children now at school may live to see those in Nauru and Ocean Islands exhausted. The origin of our supplies and the prices will then not be under our control, and it would seem prudent to use our present supplies in the most effective and economical ways.

One way in which this can be done is to exploit to the full the possibilities of the two fertility agents, lime and serpentine, found abundantly in this country. No ships, no sterling funds, no high exchange are needed to make them available. Their cost of preparation for use is mostly labour charges paid to our own people.

Prospects and Problems

Serpentine in the fertiliser field in New Zealand, if not just a wartime expedient, is a war baby in its commercial development. It was conceived before the war and its sound scientific parentage has been indicated. Serpentine superphosphate has been tested in official trials and by farmers. Even if all too limited, the experience so far gained does, it is suggested, hold out distinct promise for the new fertiliser. This view is strengthened by the characters of New Zealand soils so far known and the physical and chemical properties of this fertiliser. On the grounds of costs and prices it has much in its favour, and serpentine is found in abundance in the country.

But there are still problems that only time can solve. For the next 12 months factories have a programme of superphosphate manufacture greater than at any time in their history, and in some cases in the South Island there are as yet no special facilities for making serpentine superphosphate. The rail transport difficulty still remains and with heavier tonnages to haul may be intensified in the coming year.

But in the long run these problems will be overcome.

In the final analysis the future of serpentine superphosphate rests with the farming community, as the extent of its manufacture and use will depend on the demands of satisfied customers.

Farms and Houses for Servicemen

A REHABILITATION DUTY

FARMS and house properties for returned servicemen are urgently needed by the Rehabilitation Department. The adequate re-establishment in civil life of men from the Forces starts with the provision of suitable housing, and no efforts in other directions can be completely successful until the country has first carried out its obligations in this respect.

Those contemplating selling properties suitable for the settlement of returned servicemen should consider it their duty to give first option to a purchaser discharged from the Forces—a duty that can no more be debated than the duty those men and women under arms sacrificed so much to carry out.

Farm properties are particularly sought after by returned men, and in making available to soldier settlers suitable properties which are for sale, farmers will be doing a double service—they will be rewarding in some measure the services of the Dominion's Forces and encouraging the expansion of an occupation which is the foundation of the country's economy.

Rehabilitation is a task of national importance, and any effort towards the provision of house and farm properties for servicemen will contribute towards its fulfilment.

Radio Broadcasts

RADIO talks to farmers will be given from Station 1YA, Auckland, at 7.15 p.m. on the following dates:—

November 4—"Extension Work in Rural Sociology," by P. W. Smallfield, Director, Rural Development Division, Department of Agriculture, Wellington.

November 11 — "Current Farming Problems," by J. E. Bell, Fields Superintendent, Department of Agriculture, Auckland.

UNDER the auspices of District Pig Councils broadcasts will be delivered in November as under:—

Auckland—1YA, on November 20, at 7.15 p.m., "Points to Remember in Planning the Location of the Farm Piggery," by H. G. Clark, Supervisor, Auckland District Pig Council.

Wellington—2YA, on November 19, at 7.15 p.m., "Answers to Questions," by Supervisor, Taranaki District Pig Council.

Napier—2YH, on November 12, at 7.15 p.m., "Carcass Quality Scheme. How it Helps the Farmer," by H. Hopkins, Supervisor, Tairawhiti District Pig Council.

FARM DAIRY INSTRUCTION

Maintaining and Improving Quality of Products

THE gradual improvement of conditions under which New Zealand's milk and cream are produced is described in this article by G. Purvis, Superintendent of Butter Instruction, Hamilton. Improvement in quality of produce was given an impetus by compulsory grading and payment according to grade, and the co-operation and good will of suppliers has been sought since by the Department of Agriculture's Farm Dairy Instruction service in a continuation of the effort to help the producer in the provision of better facilities for milking and in combating contaminating influences.

ALTHOUGH compulsory milk and cream grading and payment on the basis of grade encouraged some suppliers to improve their milk and cream slightly, others showed a spirit of apathy and indifference, and no substantial progress was made until some time after the introduction of the Dairy Division's Farm Dairy Instruction service on a national basis in 1938, when a considerably changed attitude began to be evident.

Just as milk and cream grading without Farm Dairy Instruction failed to achieve the desired results, so did Farm Dairy Instruction without milk and cream grading. To get nearer the goal aimed at, which is the improvement of the raw material, it is therefore evident that the factory manager, the Farm Dairy Instructor, and the supplier must be interdependent, and each, in his sphere of activities, must perform his tasks efficiently and in close co-operation with the other.

Dairy Instructors

To ensure that Farm Dairy Instruction shall be of maximum benefit to the industry instructors are required to have among other qualifications the following:—

Experience in the manufacture of dairy produce that will enable them to recognise evident defects in milk and cream.

Competence to give advice on the erection of milking sheds.

Ability to give expert advice on the installation and operation of milking machines and separators.

Ability to demonstrate correct methods of milking shed and plant hygiene and care of the product till it leaves the farm.

Ability to trace as far as possible various defects in milk and cream and suggest a remedy.

While instructors have authority under the Dairy Industry Act, 1908, to forbid the removal of any dairy produce from a farm to the owner of which due notice of the existence of a contaminating influence has been given, improvement is rather sought by gaining the good will and co-operation of farmers.

Erection of Milking Sheds

To encourage the erection of a milking shed at a reasonable cost which will ensure the production of milk and cream with a minimum of contamination from this source and in which the whole of the milking operations can be carried out expeditiously has been one of the principal aims in the service.

Advice and guidance are given in the selection of sites for milking sheds, which should be governed by the fall for drainage, proximity to an adequate and permanent water supply, the contour of the ground, convenience for handling the herd to and from the various paddocks, and distance from the road.

An indication of the manner in which improvement of farm products has been attacked at the very source of supply is contained in the following figures:—During the two years ended March 31, 1946, 1613 new milking sheds were erected, 1772 substantially reconstructed; total 3385. New machines totalling 2193 and 1919 used machines were installed, a total of 4112. As the shortage of labour and materials was acute during this time these figures are impressive.

The service will provide the plan and peg the lay-out, giving consideration to the maximum penetration of sunlight into the shed and the direction of the prevailing wind with a view to having the separator or milk-collecting room on the windward end. Fall for drainage has also to be considered so that this will flow from the milk or separator room through and beyond the shed to a sump, which must be at least 30ft. away from the outer edge of the yard.

The service provides supervision of the erection of a new shed to see that it is erected in accordance with the plan and gives advice on renovations and modernisations of existing sheds to improve sanitary conditions and to bring them into conformity with modern lay-outs. Estimates of quantities of materials are frequently provided and arrangements made for the necessary labour to carry out the work.

Inspection is made of the sanitary conditions of milking sheds and plants, acting in collaboration with the dairy factory manager, and suppliers encouraged to maintain and where possible improve the quality of milk and cream.

Coats off During War

Although it was not part of their duties, Farm Dairy Instructors helped to alleviate the shortage of skilled labour throughout the war, particularly in the South Island, by giving a great deal of "coats-off" assistance with the erection of milking sheds and the modernisation of existing sheds. Had it not been for their assistance, much of this work could not have been done. The longer dairying season in the North Island has precluded them from giving assistance there to the same extent as in the South.

Shed Improvement Trends

Of late years the internal race shed with gate dummies has gained very much in popularity because of its warmth and convenience. Frequently dummies and bails have been constructed of galvanised iron piping or angle iron, which makes for more sanitary conditions. In some sheds the dummies are suspended from the roof, which leaves the floor free from obstruction.

Where shingle is readily procurable sheds have often been built with concrete walls to roof. Maintenance costs are reduced in this more durable structure, and provided shingle costs are not excessive, initial costs are not much greater than with wood and iron walls.

Sanitary conditions are easy to maintain in this convenient shed with concrete walls to roof and 4ft. concrete walls round the holding yard.

The regulations require 4ft. concrete walls at each end of the milking shed, but many sheds erected in recent years have had 4ft. concrete walls around the separator room as well, and all walls of some internal race sheds have been of concrete 4ft. high. Separator rooms have been lined and the interior of sheds painted throughout. In some districts a considerable number of these sheds have been registered for town supply.

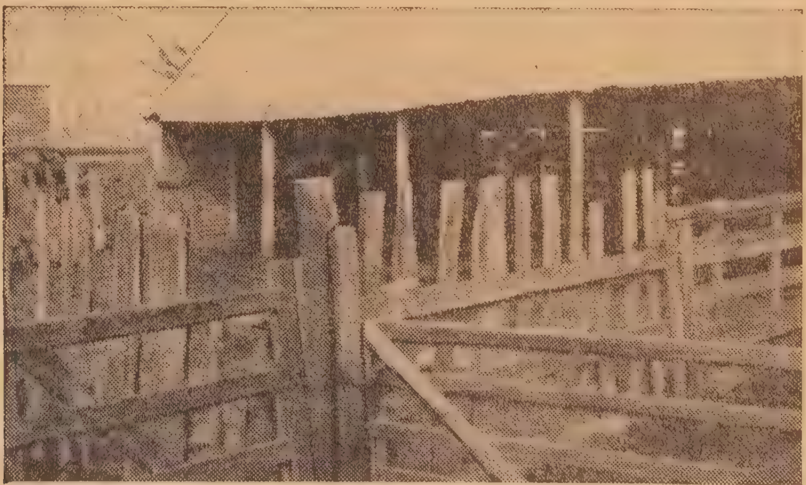
An innovation in the holding yards has been the erection by some suppliers of a concrete wall about 4ft. high in preference to the post-and-rail fence. The advantage claimed for this form of construction is that it reduces draughts in the holding yard and is invaluable in cold weather; others, however, think that the yard becomes too hot in warm weather.

Many of the old types of sheds were built with wall plates at floor level and had little or no concrete floor, with uneven or insufficient falls and inadequate or bad drainage. Considerable time and labour were involved in maintaining them in anything like a sanitary condition, and even if this time were spent, they still remained potential sources of contamination. Many were also badly planned from the point of view of carrying out milking operations quickly.

Improvements in Machines

In keeping with improvements in design of the milking shed from the sanitary and labour viewpoints, Farm Dairy Instruction has also been concerned with improvements in design, construction, and installation of milking machines. If defects in manufacture or possible improvements in design are noticed during instructors' visits of inspection, these are brought to the notice of the supervising officer, who discusses them with the manufacturer and seeks his co-operation in having them remedied. One has only to visualise the milking machines of 20 or more years ago, with engines in separator rooms, and compare them with those of today to realise the progress that has been made.

Galvanised piping has been replaced with tinned brass tubing for air systems. Insanitary and inaccessible parts have been replaced with sanitary fittings. Long lengths of piping have been eliminated and the installation in the milk-collecting or separator room made more compact. To facilitate cleansing the whole installation is made more accessible and can be flushed to and including the vacuum tank with ease. Similarly separators and other dairy equipment have been improved in design as the result of experience gained in Farm Dairy Instruction work.



With wall plates at floor level, no concrete floors, and inadequate drainage, many old milking sheds were potential sources of contamination and badly planned for milking operations.

Installation of Machines

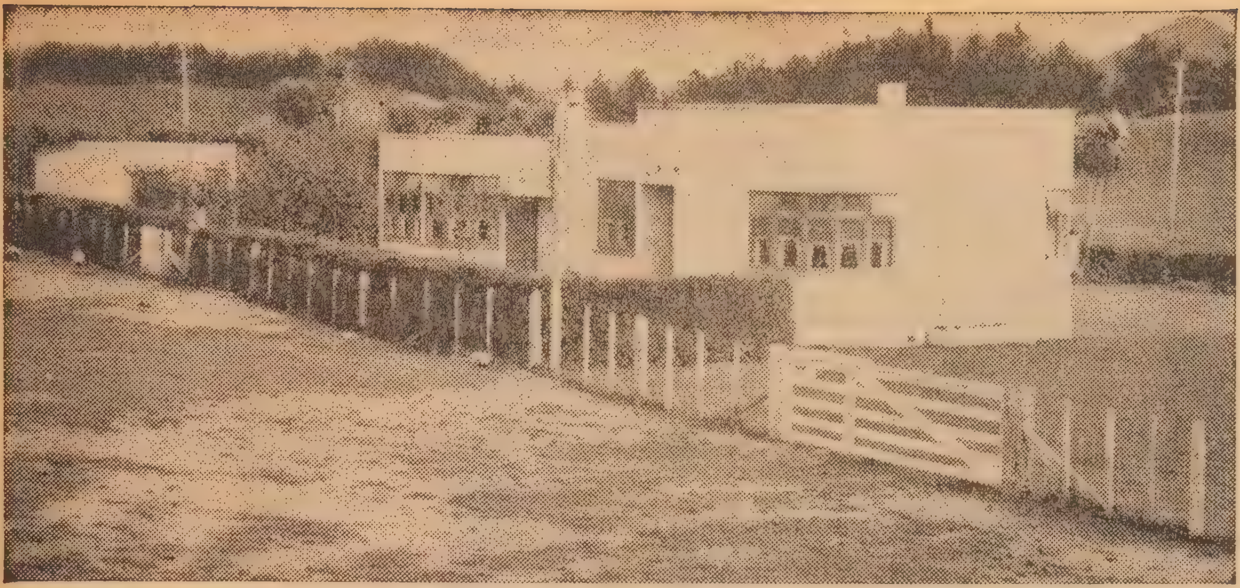
In Dairy Instructors' supervision of the installation of new milking machines the interests of both the farmer and the industry are protected. Agents for milking machines are required to notify the Dairy Instructor for the district of the address of the purchaser of new equipment, and the instructor makes an inspection of the shed and if necessary advises the owner of improvements needed before installation can be made. After approval is given for the installing of the machine a further inspection is made and the installation passed if the regulations have been observed.

Before re-erection all used milking machines must be inspected by an officer of the Dairy Division and any repairs necessary carried out or replacements made.

Farmers who have not had previous experience in the operation, care, and cleaning of milking machines and separators may have the methods demonstrated by a Farm Dairy Instructor, who will also pay regular visits until the farmer has become familiar with the plant.

Routine Sanitary Inspections

Thorough inspections are made of all milking sheds and plant to ensure that a reasonable standard of cleanliness is observed, and demonstrations are frequently given of correct methods of shed hygiene. During the war instructors even went beyond their duties in effecting repairs to machinery when no skilled labour was available. Only where it is evident that defects are due to deliberate neglect is the authority to forbid the removal of any dairy produce from the farm exercised.



DEVELOPING A PUMICE LAND FARM

THE development of farms on the pumice lands of the Central Plateau of the North Island was long retarded by the occurrence of a deficiency disease of ruminants known as "bush sickness." Accordingly large areas were converted into forests of exotic trees, but more recently, with the discovery that bush sickness can be overcome by the use of cobalt, the development of farms on the pumice soils has received renewed attention. As soon as phosphatic fertilisers are again freely available pumice land development is likely to be pushed ahead and the area offers considerable scope for organised settlement. This article describes the experiences of two families who had the courage to develop an uninviting section of scrub and tussock into a productive farm at a time when the prices for primary produce were low and the prospects for farming success on the pumice lands were somewhat uncertain. A. T. Shannon, Field Economist, Hamilton, describes the process of land development and Eva Topping, Rural Sociologist, Auckland, has supplied the sections on the development of the homes, for no description of land pioneering would be complete without due recognition of the importance of home building.

A FEW years ago any farmer who proposed to establish himself on the scrub and tussock of the Rotorua pumice country was regarded as a super-optimist. The general feeling was that such a project involved a lifetime of hard work and privation with only the vaguest chance of making a success on what was possibly bush-sick country. This story of how two brothers made good illustrates the possibilities of pumice land farming, for there are many who still despise this country because they know nothing about it. No suggestion is made that everyone could be as successful as these brothers have been; present economic conditions are rather different and some pumice soils are less suitable for farming. In any event, hard work is a most essential ingredient.

Born to farming life, the brothers had a broad experience in sheep and dairying in the Palmerston North-Wairarapa district, where their grandfather had pioneered a farm at Masterton. Circumstances had been none too kind to one brother, for in 1926 he was forced to quit a high-priced dairy holding and work for some time for a stock firm and elsewhere. This apparent failure, though disheartening, was valuable, because it emphasised the difficulties which have to be faced through excessively high capital and interest commitments. The other brother was managing a sheep farm at the time, although he was experienced in general farming and contracting, and both realised that if they were to own farms, the initial outlay would have to be very small indeed and the land very cheap. Where could this land be secured?

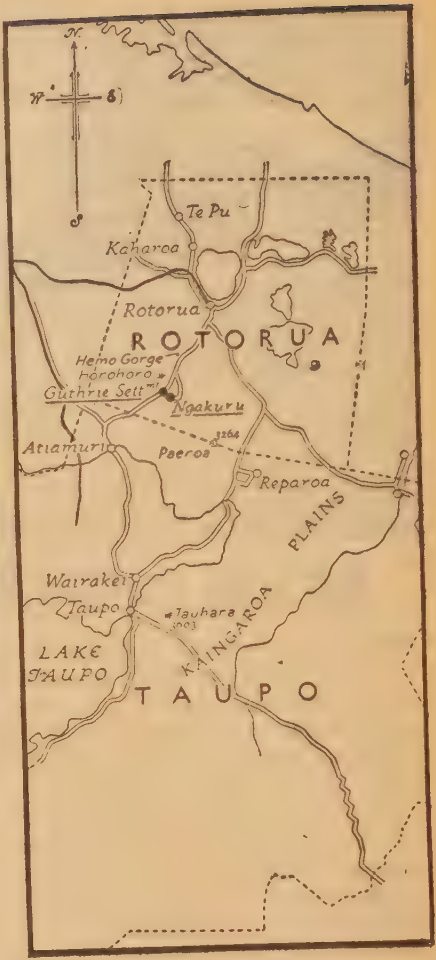
Inferior Lands

The opportunity presented itself when reference was made in a speech by the then Minister of Lands to Crown lands available for settlement. Further details were provided by the official description of sections for ballot, but the wording under the heading "Inferior Lands Open for Selection" left little doubt what to expect from the country. However, for a guinea right of occupation could be secured for 10 years under stated conditions of improvement, and the brothers decided to take a gamble and applied for a block of 398 acres. Apart from one early settler, less than half a dozen men had taken up other blocks in the three years that the land had been open for selection, so poor was the general impression.

"The only men who would come to this district were Scotsmen," said Mr. G. Hutchings, "and that was because the land was so cheap. Like others, we had almost no money or we would not have come, and once that capital was sunk we had to stay." Assets consisted of four half-draught horses, a spring dray, a plough, discs and harrows, a little furniture, a model T Ford, and a very small amount of money. Both men were married and there were two small children in each family.

A week's trek from Palmerston North in November, 1930, brought these men and their possessions through Taupo to Ngakuru along a dusty pumice road through desolate scrub country to the 398 acres, where their tents were pitched among the

NGAKURU BLOCK


N.
W.
E.
S.
Te Pu
Kaharoa
Rotorua
ROTORUA
Hemo Gorge
Horohoro
Guthrie Settmt
Ngakuru
3264
Atiamuri
Paeroa
Reparoa
PLAINS
Wairakei
Taupo
Tauhara
LAKE
TAUPO
KAINGAROA
TAUPO

Above—Undeveloped pumice country: a wilderness of manuka and manoao scrub and tussock.

Right—Locality map: Ngakuru and Guthrie Settlements.

[Map by Lands and Survey Dept., Wellington.

Below—Ngakuru Block showing Mr. F. Hutchings's present farm in the foreground.

[Photo by Jenson, Rotorua.

manuka and scrub in the wilderness. The wives and families followed the men two months later.

According to the advertised description, the holding consisted of "terraces and gullies, watered by flax swamps and the Whirinaki Stream, about 70 per cent. ploughable." The description of this farm is fairly typical of the district which was at one time a lake bottom. There are few flat areas, and this to some extent is fortunate, because as a rule on pumice country the hills carry better grass than the flats. The gullies are useful for shelter and the valuable picking for stock which they provide stood by the Hutchings brothers in the early years. In fact, apart from a limited amount of chaff, the horses had to support themselves on this rough grazing. Wild horses and cattle had roamed the locality for years before it was settled, explaining to some extent the presence of grass, mainly Yorkshire fog, in the gullies.

Breaking In

It did not take long to consume the small amount of ready cash, though the money was made to go much further than would be possible today. The 2 two-roomed huts were erected from timber purchased at Rotorua, the first 10-acre paddock was fenced off with the cheapest available materials, and the job of breaking in commenced.

With their money spent, 10 acres sown down, and one cow on the holding (the house cow, grazed among scrub and tied up at night), the Hutchings had to go out to earn enough to live and carry on the farm development. Fortunately at the time the State had become interested in pumice land development and commenced breaking in areas in the Ngakuru district. The brothers took full advantage of the opportunity offered to undertake both contract and casual work such as scrub cutting (at 22/6 per acre), ploughing, tree planting, blacksmithing, and shearing.

After both of them had worked for a year in this way it was arranged that first one and then the other went out to work, one always remaining on the farm to push on with the development programme. A number of settlers found it possible to establish themselves in the district in a similar way, even though they had practically no cash to start with. At the same time the various methods adopted by the State to bring the land into production—the cultivation, sowing down, and manuring — afforded observant farmers a first-class opportunity to learn at little cost to themselves.

The first necessity was to get feed as quickly as possible at the lowest cost, and consequently the 40 acres ploughed up to early 1932 were sown down to permanent pasture with oats between November and January. The experiences of other settlers and the results on State-developed areas amply demonstrated the excellent possibilities of root crops, but several seasons were to pass before advantage could be taken of this.

The procedure in breaking in exemplifies the remarkable ease of developing pumice country. At first the scrub was cut before ploughing, but burning and leaving for a year or two eliminated this at later stages. It is preferable to plough in autumn or early winter and leave fallow for the frosts to sweeten the soil. Towards September breaking down commences, the soil being worked about once a month with discs and harrows before sowing down to grass.

While the shortage of cash prevented the Hutchings brothers from sowing 45lb. of seed per acre with 3cwt. of superphosphate, followed by another 3cwt. a few months later, at least they were able to spend their money to best advantage and to approach as near as possible to the ideal. Accepting the advice that sowing cheap inferior seed could only result in inferior pasture, it was determined to sow only the best seed obtainable. Even if the sowings were light and the sward did not become close for two or three seasons, the final results confirmed the wisdom of a good basis in spite of the temptation to use cheap seed.

As a compromise between what they would like to have sown and what they could afford, the Hutchings adopted the following mixture:—

	lb. per acre
Certified perennial rye ..	6
Cocksfoot	4
Cowgrass	4
Timothy	2
White clover	2
Crested dogstail	2
	20

In discussing breaking in it was remarked, "It is better to reduce the area and sow good seed than to put down a larger area with light seeding, poor seed, and insufficient fertiliser." Their experience is that sowings can be made either in spring or autumn with equally good results, and in fact any time between October and the beginning of March is quite suitable.

The mixture was sown with 1½ bushels of Algerian oats per acre, or 8oz. of Hardy Green Globe or Mammoth Purple Top turnips per acre with 2cwt. of superphosphate. More fertiliser would have been used had finances permitted, but the seeding and fertiliser used were regarded as a minimum. While circumstances required sowing to permanent pasture on the first ploughing, the opinion is that it pays to plough up again after about five years. The resulting pasture has a better sole of ryegrass, cocksfoot, and clover that is really permanent.

Steeper faces are still being broken in on the 398-acre block, and this April sidelings amounting to 10 acres were being prepared for sowing, using discs behind a 6-horse team after the scrub had been burned a year or so ago. On another area steep faces had been sown with a light seeding of cowgrass mixture with some fertiliser in the ashes of a burn. Resown a year later with a permanent mixture of 10lb. per acre and 1cwt. of superphosphate—all that can be spared—pastures are slowly becoming established.

In the beginning fencing proved to be the chief hurdle, mainly because of the cost, even though birch posts were only £2 10s. 0d. a 100, best totara could be secured at £7 a 100, and wire was about £20 a ton. Costs were cut by making do with three-wire fences and butting fences on to swamps. As finances made it possible paddocks were reduced in size to from 6 to 15 acres for the most part. The surprising thing is that the majority of the original birch posts are still in good order, those that rotted going in the first few years. Totara is much preferred for fencing, even at £25 a 100.

It became apparent that shelter belts would be valuable, even though gullies and standing scrub provided good shelter. Time has shown these farmers that *Lawsonianas* are the best; pines are inclined to be draughty on their own and kill grass growth with fallen needles. The cost prevented shelter planting in the first years, but at that stage there was more manuka available.

Constant attention was devoted to keeping the ragwort in check by pulling and spraying. The farms are very free from weeds, other than ragwort, and the district as a whole is fortunate in this respect.

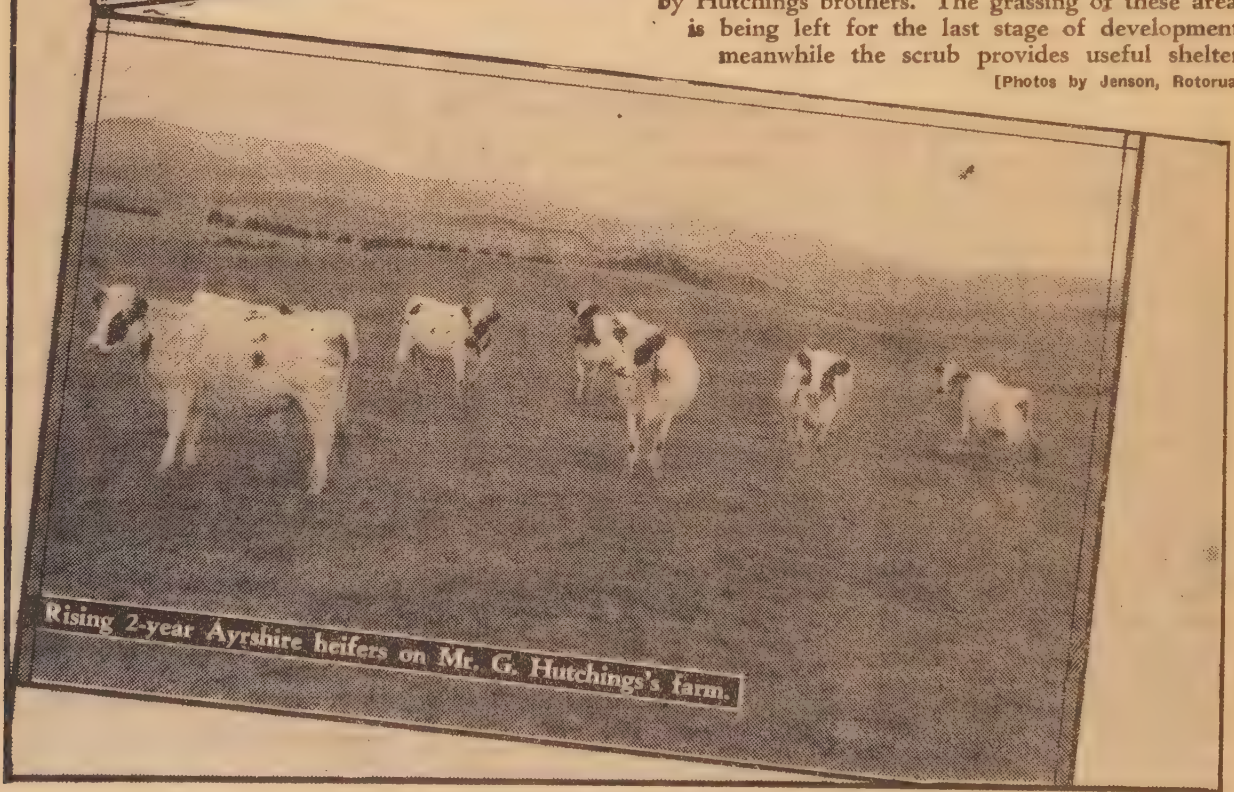
Progress

The achievements of the first three seasons are summarised in the following figures:—

Season	Cows carried	Grass Sowings Date	acs.	Total area acs.
1930-31	1	Jan. 1931	10	10
1931-32	14	Nov. 1931	15	25
		Jan. 1932	15	40
1932-33	34	Oct. 1932	60	100

Undeveloped gullies on the original section broken in by Hutchings brothers. The grassing of these areas is being left for the last stage of development; meanwhile the scrub provides useful shelter.

[Photos by Jenson, Rotorua.



Rising 2-year Ayrshire heifers on Mr. G. Hutchings's farm.

The herd of 11 heifers and 3 cows was established in 1931 at an average purchase cost of £4. While this stock had the advantage of new fresh grass when on pasture, they also had to get what grazing they could on the tussock and in the gullies. Today in Ngakuru the value of rough grazing as a standby is thoroughly appreciated. For yearling heifers and for winter feed in addition to hay and crops the tussock and scrub country is still looked to, and so, while gullies can not all be broken in, they are by no means a liability.

Under the conditions of feed, total production for the season at 1,500lb. fat was not unexpected. Next season, with 40 acres available for grazing, further stock were bought, and the 34 head milked included 11 purchased heifers. These 34 head produced barely 6,000lb. fat, an average of about 180lb. The experience of other settlers in the district is that an average production of 180 to 200lb. a cow is all that can be expected in the first few struggling years.

In October, 1932, a further 60 acres had been sown, bringing the total up to 100 acres, and this, with the annual lease of 60 acres of newly-grassed State property, made it possible to milk 56 cows in the following season. Some months later milking machines were purchased on time payment. For the first time the brothers were able to devote their energies entirely to the farm, without going out to work. In fact at times a boy was employed, and development was speeded up. By 1934-35 the farm had 150 acres in grass, and with the leasehold upwards of 120 cows were milked. A man was employed full time and the production reached 23,000lb.

The Farm Homes

Two young women and their four small children arrived at Rotorua station on December 27, 1930, on their way to the pumice country to begin a new life. They had started on Boxing Day, leaving their homes near Palmerston North, and travelling by rail and road for almost 24 hours. At Rotorua they were met by the husband of one of the young women in a model T Ford and set off on the last stage of their journey. Both were tired and travel-stained and very anxious to reach their destination. A few miles out of Rotorua one of them asked, "Are we nearly there?" "Oh, yes," was the reply, "It isn't far now!"—but that was only about a quarter of the 17 miles to the Ngakuru district. When at last they came within sight of their new home, it looked such a tiny speck in the surrounding waste of tussock and scrub that both girls felt some misgivings as to the wisdom of the step they had taken in following their husbands into this new venture which promised to be so much like the early pioneering days of New Zealand.

"Home" was a two-roomed shack which the men had built, and a tent pitched alongside. One family slept in the shack, and one in the tent, while they shared the building for cooking and eating. Two shacks were to have been built, but there had been time to have only one ready before the arrival of the wives and families. Fortunately the weather was warm and fine, so tent dwelling was not unpleasant and the men started on the second shack without delay. The little buildings were well built, finished with match-lining inside, a corner wardrobe in the bedroom, cupboards for groceries and crockery in the kitchen-living room, and a Dover stove for cooking and heating. Neither of the wives thought much of the place at first; there was no formed road, no cultivated land, and no neighbour in sight; but they were both blessed with a cheerful disposition and the determination to make the best of things and help their husbands to wrest a successful farm from the tussock and scrub of this "inferior" pumice country in which few people had much faith at that time.

For a start they had a house cow and some fowls, and in a very short time they had started a garden and were producing good vegetables—lettuces which were "too big for one meal," cabbages, cauliflowers, potatoes, and carrots. In fact, they were so successful with their vegetables that they had more than sufficient and were able to dispose of their surplus to a travelling salesman and received fruit in return. With plenty of milk, cream, butter, eggs, and home-grown vegetables wholesome food was assured, and living expenses were cut down considerably. A baker's van had begun a round in the district when the Government development scheme had started, for the number of men in the camps made it worthwhile for a baker and butcher to send out supplies and the mail from Rotorua. So it was not necessary to bake bread, which was a great help, as the Dover stove was not really suitable for baking; the oven was wide but not very deep and the loaves burnt either on the top or the bottom. Groceries and other goods had to be bought in Rotorua, and once a month the two families set off in the Ford to shop. While the men did the business connected with the farm, the two wives bought groceries and such items of clothing as were necessary. Each had a fixed amount and by careful spending they managed to get most of the essential things, but they just went without things their money would not buy, so they had no incoming bills to worry about. Most of the children's clothing was made by their mothers.

Cooking and heating were done by wood, which was plentiful in the district at that time; in fact it is only of recent years that some coal has been used. For washing clothes and heating bath water a copper stood in the open, as also did the bath. When needed it was carried into the kitchen; then, after the family bath session was over, it was taken out and turned upside down until next time.

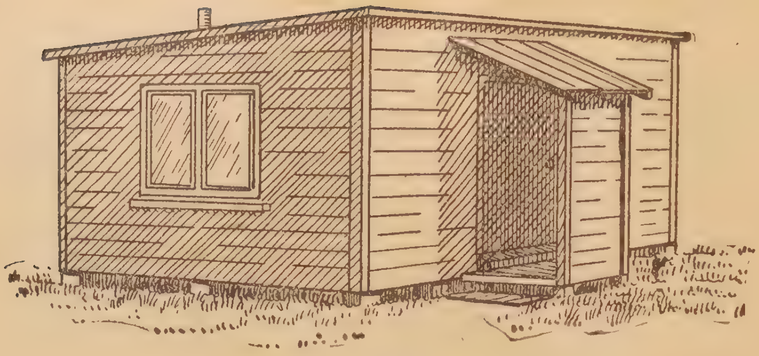
During the first few years while the land was being brought into cultivation and the herd increasing the wives helped the men with the morning milking, and did the afternoon milking by themselves, leaving their husbands free to work on the Government development block or on their own farm. The children helped too as they began to grow older, by getting in the cows, feeding calves, or by taking care of the fire and keeping the meal cooking while the milkers were busy.

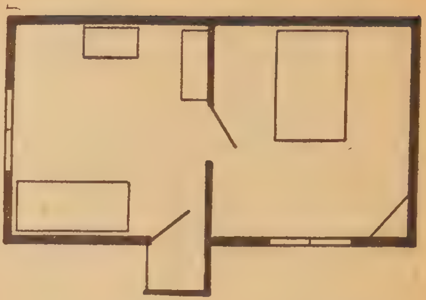
When haymaking time came the milking was finished and the evening meal ready by the time the men returned from work and all went out after tea to make the hay. With milking, gardening, pulling ragwort, cooking, sewing, mending, and all the hundred and one other usual duties, plus some additional chores caused by their lack of facilities, the two mothers' days were very busy. Even so, they found time to go for picnics in the fine weather, visit their neighbours, and to entertain friends and have relatives to stay.

When the children were ready to go to school they had a journey of 8 miles to the other side of the block where there was a small school of about 15 pupils. At first the teacher made a circular tour and picked up his scholars, a trip that must have been very hard on his car as the roads were poor and his load heavy. This arrangement did not last long, for the settlers agitated for the school to be moved to a more central position. Eventually their efforts were successful, the school was re-established on a site much nearer the Hutchings' land, and the roll rapidly rose to 60, amply justifying the move. A school bus operates in the area at present, though for a long while the children arrived on ponies or on foot. When primary school days are over those children who go on to a secondary education have to leave the district for Rotorua High School or else attend boarding schools.

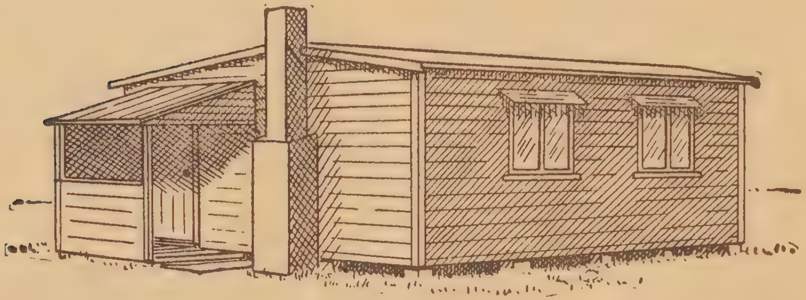
Expansion

The 60 acres leasehold were relinquished in the 1935-36 season, but a

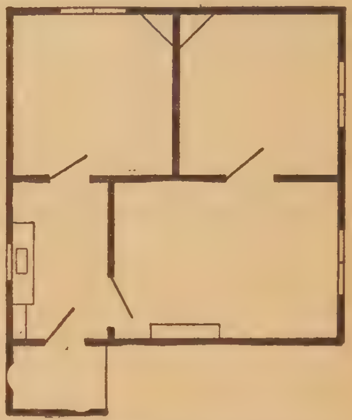


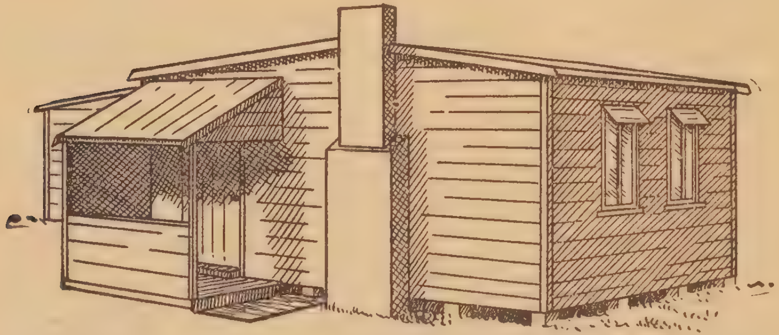


Left—Original shack. Above—Floor plan of interior with stove, cupboards, and children's bed in kitchen, and corner wardrobe in parents' bedroom.

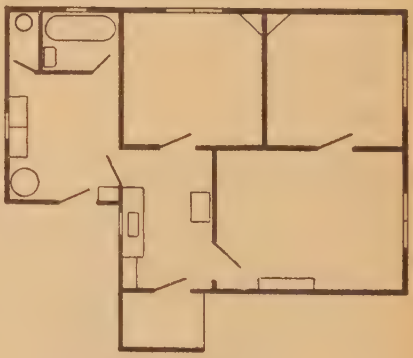


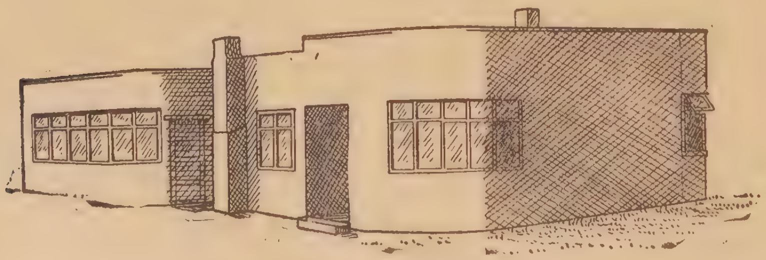
Above—Four-roomed cottage made by joining the two shacks. Right—Plan of cottage showing new positions of windows and altered arrangement of wall to give different dimensions to kitchen and living room.

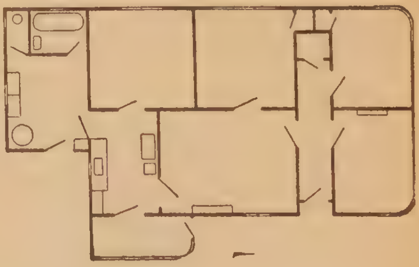




Above—Cottage has laundry and bathroom added behind kitchen. Right—Plan shows addition of laundry with copper and tubs, bathroom and lavatory.







Left—Sketch of completed house. Right—Plan showing final addition of bedroom and sitting room, entrance hall with farm office, built-in wardrobes in two bedrooms, and sunporch.

further 240 acres of Crown-developed land were secured. On this area 146 acres were grassed and ring fenced, but there were no subdivisions or buildings. The price at £1,800 was in line with values at the time, and this affords an interesting comparison with land values elsewhere.

For a season the recently-acquired holding was run from the home farm until dwelling and buildings could be erected. The total area, 300 acres in grass and crop and 360 acres in rough, on the two farms carried between 140 and 150 cows that year and produced almost 30,000lb. fat. Since then development has proceeded and there are still some ridges and gullies which can be brought in.

When the 240 acres were secured it was found desirable to purchase a tractor to speed up farming operations. The acreage provided ample scope—the horses for steep and rough going and the tractor for cropping and easy work on the flats. For the most part a tractor has a valuable place on a pumice farm provided the country is not too broken and there is sufficient work.

A New Home

In 1936 the F. Hutchings moved from the original site to a four-roomed cottage which they had built on the newly-leased holding. Here Mrs. Hutchings again began making a garden around her home. She planted a shelter hedge along the fence and soon had flowers and vegetables growing, while fruit trees were planted on a slope at the back on either side of the path which led to the cowshed. This cottage is very compact, and having been planned by practical country people who know from their own experiences what is required of a farm home, it has many convenient features. The wash-house, bathroom, and patent lavatory open off the kitchen, with another door to the outside. Like many other farm housewives, Mrs. Hutchings considers that the bathroom in a country home should not be in the middle of the house. Wet coats, muddy gumboots, stockwhip, bridle, bag of staples, hammer, wire-strainers, or any other paraphernalia that the busy farmer brings with him when he comes to the house can all be shed at the porch by the wash-house door; then he can wash and prepare for the meal without having to go through the house, leaving a trail of clutter or wet footprints on the way.

Later when the F. Hutchings left this house and went to the new farm where they now reside, this cottage was taken by the sharemilkers, and there is no doubt they also appreciate the comfortable home. Mr. F. Hutchings is of the opinion that married men working for farmers should have convenient and comfortable houses in which they and their families can take a pride, and is sure that such homes make for good relations between the farmer and his workers.

In 1944 the F. Hutchings moved on to another farm on which the house was already built when they purchased, so Mrs. F. Hutchings had not the same opportunity of influencing the design and layout of the rooms. Though she is well satisfied with the new home, there are one or two features which she thinks could have been better planned. The bathroom is centrally situated, and though there is a handbasin in the laundry, Mrs. Hutchings thinks that is not really sufficient, and she has been promised either a shower box or extra bathroom in a more suitable place when materials are easier to obtain. Mrs. Fred Hutchings's family is now five, three boys and two girls, and she considers that a second bathroom for the menfolk would be most convenient and quite justified. The new kitchen is divided in two by a partial wall of cupboards, forming a work area and a place for meals. When her family is at home there is scarcely room for them all around the table, and when extra visitors arrive the dining space is very much too small. The working area is rather bigger than necessary, so they plan to alter the arrangement and position of the dividing wall and enlarge the eating space. When these alterations are made the house will be in line with Mrs. Hutchings's ideas of a convenient and comfortable farm home for her family.

The House That Grew

Meanwhile the G. Hutchings stayed on at the original site and had gradually enlarged and altered their home as circumstances changed. When the F. Hutchings left in 1936 to go to their newly-built cottage on the new property, the two shacks were put together to make a gable-roofed cottage of four rooms. The two bedrooms were left their original size, but the dividing wall (formerly the exterior wall) between the kitchen and living room was altered to give a larger living room. A range was put into this room and a sink installed in the kitchen in the place where the Dover stove had been. The locations of the windows were altered, giving two in the new front wall, one on the end for the back bedroom, and one over the sink. The entrance door opened into the kitchen and a porch was built here which also served as a wash-house for a while, with the copper standing alongside in the open as formerly. Later on a further building job was done at the back of the kitchen to give a wash-house with copper, tubs, and large cupboard, a bathroom and patent lavatory. A communicating door was put in on the back wall of the kitchen and an outside door to the wash-house. Now the cottage had all conveniences under one roof and was very comfortable and quite big enough for the young family. When electric power came to the district the range was taken out of the living room and an open fireplace built. The copper also was discarded in favour of an electric washing machine.

The final additions made in 1944 consisted of an entrance hall, sitting room, third bedroom, and a sunporch. Planning this extra accommodation presented some difficulty owing to the shape and slope of the original roof, and after consultation with builders it was decided that the house would need a new face to hide the irregular outlines of the roof areas. The style which would produce the most satisfactory result was the Spanish bungalow type. The windows in the living room were once more moved, this time to the end wall of the original shack, now the side of the cottage; the front bedroom double windows were changed to three with fanlights and put in the side wall. The entrance hall was put along the front of the cottage, a door from the living room to passage was put in, and the bedroom door also was moved from the living room on to the front wall to open into the passage. The end of the passage forms a wardrobe for each bedroom, and immediately in front is a space which has been converted into an office for the farm accounts and papers connected with farm operations and pedigree herd records.

The porch at the back door was entirely altered and enlarged to make a most attractive sunporch with seven windows and fanlights. It is large enough to take a single bed under the windows and so serve as an extra bedroom if required, and is an ideal spot for sewing, reading, or just relaxing. The whole exterior was finished in roughcast, the parapet being made high enough to balance the size of the completed house and to disguise the roof line.

This is the history of the evolution of a house which started as a two-roomed shack and is now a pleasant home of three bedrooms, two living rooms, kitchen, bathroom, laundry, and sunporch, which changed and grew in a living way even as the family who occupy it have changed and progressed.

Winter Fodder and Cropping

Settlers on the pumice usually refer to the winter in uncomplimentary terms, not only because of its length and severity, but because it involves adequate provision of winter feed. The

THESE BULLETINS WILL HELP YOU ON *YOUR* FARM

There are so many important aspects to farming that a book could be written about each one. And that is what the Department of Agriculture is doing. Each of the bulletins illustrated deals in a comprehensive but PRACTICAL way with proved farm practices.

FARMING IN NEW ZEALAND
PASTURE PRODUCTION IN NEW ZEALAND
SHEARING
KILLING YOUR OWN MEAT

"FARMING IN NEW ZEALAND"

Comprising 200 pages with illustrations on practically every page, "Farming in New Zealand" is the first book of its kind published. It describes briefly but clearly the essential features of crop, pasture and livestock production and contains 14 descriptions of farm management on actual farms. PRICE, 2/6d.

"PASTURE PRODUCTION IN NEW ZEALAND"

With grassland the basis of agriculture in New Zealand, a knowledge of pasture production and management is essential for efficient farming. Of 126 pages and lavishly illustrated, this booklet describes the place in the agricultural and pastoral industry of the more common species of grasses and clovers. PRICE, 1/-

"SHEARING"

There has long been a need for a sound textbook on shearing. Written by a man with a wide experience of the art, this bulletin provides a sound basis for the man who wishes to become a shearer and also contains useful "pointers" for the old hands. There are 27 pictures illustrating correct stances and technique. PRICE, 6d.

"KILLING YOUR OWN MEAT"

The finer points of butchering are ably dealt with in this bulletin, which discusses the most hygienic and efficient methods of killing on the farm. There is also a guide to the various cuts and their uses and the curing of meat. PRICE, 6d.

"POULTRY KEEPING"

Whether you keep poultry as a commercial proposition or as a hobby, you'll find valuable information in these bulletins.

Part 3: "The Theory and Practice of Incubation." PRICE, 6d.

Part 4: "The Theory and Practice of Poultry Feeding." PRICE, 6d.

Part 5: "Chick Raising." PRICE, 6d.

Call at your nearest office of the Department of Agriculture for these bulletins or post this coupon.

Department of Agriculture,
Auckland, Wellington, Christchurch, Dunedin.
Enclosed is my remittance for the bulletins marked.

NAME ....

ADDRESS ....

....

Mark with an X. All Post Free.

☐ No. 252: Farming in New Zealand .. PRICE 2/6
☐ No. 250: Pasture Production in New Zealand PRICE 1/-
☐ No. 246: Shearing .. .. PRICE 6d.
☐ No. 249: Killing your Own Meat .. .. PRICE 6d.
☐ No. 197: Incubation .. .. PRICE 6d.
☐ No. 198: Poultry Feeding .. .. .. PRICE 6d.
☐ No. 199: Chick Raising .. .. .. PRICE 6d.

season is about three weeks later than in the Waikato, there is no winter growth, and calving is rather later. To make full use of root crops with laying down pasture, the Hutchings have worked out a fairly typical rotation.

When breaking up pasture it is ploughed in October and worked up and sown in swedes about the end of December. Fed off in late winter, the swede paddock is ploughed again 6in. deep, worked up, and sown in October to Mammoth Purple Top for feeding off in February-March, or to Hardy Green Globe for May to June. The tendency is for early-sown turnips to rot easily. A recent practice has been to sow new grass with oats, either up to the end of March if possible, otherwise in early October. The oats are cut for hay in February.

Crop feeding is arranged where possible so that the cows have a run-off at all times to the fern and tussock or to a gully swamp with fog, clover, and trefoil. This is also desirable to avoid red-water, which is a possible trouble from swede feeding.

A good indication of carrying capacity and winter fodder requirements is afforded by the position on the 240-acre farm on which there has been a sharemilker since 1944. The 200 acres in grass were stocked with 82 grade cows, 11 heifers, and replacement stock. Bloat caused the loss of six and seven were culled for other reasons soon after the season commenced. From the 80 cows consistently milked the factory returns were 21,000lb. fat, approximately 270lb. per cow and 128lb. per acre. While the picture this year of drought is by no means so rosy, there is an early possibility of milking 100 cows on this property.

In October 30 acres are shut up for cutting in late December or early January for hay or silage according to the weather. Ngakuru, it is claimed, is not a good haymaking area because of the liability to rain, but on the other hand it is not as dry as many North Island districts in January and February. There are about 10 acres of soft turnips for autumn feeding and the aim is to have a further 10 acres of swedes for the winter. Because of unusual circumstances the swedes were not sown until early January this year, and a failure resulted from the drought. The area was accordingly sown to oats in the first week of March to provide early spring feed.

Finance

It is interesting to follow up the difficulties in financing the farming development and to note the milestones in progress. The 14 milkers secured in 1932 for £4 each were to be paid out for their equivalent production, but butterfat prices fell to rock bottom that year and it required virtually the entire season's output from these heifers to pay for them. However, this stock was mortgaged to the New Zealand Co-operative Dairy Company to enable the herd to be built up to 34. Subsequently as the mortgage was reduced further loans were obtained from time to time on the security of the herd to purchase additional stock.

Financial institutions were by no means keen to advance money to pumice farmers in those days due to previous short and sad experience in other localities. However, one banker proved less reluctant than others to see a successful future for Ngakuru, and a small loan on personal security enabled a good start to be made with pig keeping. This venture has developed to the stage where one brother secures a gross return of £3 per cow and the other has launched out with pedigree Large Whites. Layouts and pig houses are features of both farms today. The particular bank doubtless has good reason to approve of the foresight of its manager who first had confidence in pumice farming.

In 1932-33 an advance of £400 under the Advances to Settlers Act made it possible to erect boundary fences, construct satisfactory cow bails, and to lay down a further 100 acres of grass. Up to this time 56 cows had been milked by hand, a feat made possible by the loyal co-operation of wives. However, on the financing side, it is the dairy company which receives most praise from the Hutchings brothers, for this was the first institution to have sufficient faith in the future of pumice to extend consistent financial support to farmers.

While the original holding had been taken up on licence at the cost of a guinea, the terms and conditions made it possible to secure the freehold title in a short time without further payment. It was required to effect certain improvements each two, four, and six years. Within six years not less than a quarter of the total area of the section had to be in permanent pasture and the land had to have on it permanent improvements to the value of 15s. per acre. It is interesting to note that though these terms appear particularly attractive now that the possibilities of the land are known, there were still several sections not taken up four years after they had been offered for selection.

The Pedigree Stock

Pedigree Ayrshire breeding has crowned the achievements of these two brothers, and their success at annual sales has been marked by the attendance of buyers from all parts of New Zealand. Production figures from the pedigree herd on one farm illustrate the potentialities of pumice land when handled by experienced men. This farm of 220 acres has 120 acres in established pasture, a further 40 acres have been lightly surface sown, and 60 acres are in scrub and plantation. Testing records of cows and heifers averaged 339lb. fat for the five years before coming to this farm, and the average since then has been 348lb. for 1943-44 and 344lb. for 1944-45, again including heifers. Carrying capacity this year is 58 cows and heifers in milk, 25 springing heifers, 20 yearlings, 15 bulls, 4 stud bulls, and 2 horses.

Recently the brothers imported four bulls from Canada, and the remarkable list of records behind the breeding of these animals suggests that the material is available to effect a worthwhile improvement in the existing level of production. So far as type is concerned, a large number of show successes attests to the approval of experienced men. In 1945 at the Waikato Show, for example, the Hutchings secured the championship prize for an Ayrshire cow, first and second prize in the over 4 (aged) cow class, and first and second in the senior breeders' group. It is clear that pumice country is well able to hold its own so far as quality stock is concerned. In addition, herd testing returns show that Ngakuru is at least as good as the average for the Auckland district.

In conclusion, the Hutchings brothers are very positive in stating that what success they have achieved has been largely due to the help, toleration, and co-operation of their wives and sons, for at first there was much to put up with and little money to spare. Also the advice of the Department of Agriculture, especially during the period of the development of the Ngakuru blocks, is sincerely appreciated. More than anything else, the ability of these brothers to work as a team and the opportunity afforded to work on State schemes to bring in ready cash are the factors which contributed to the success apparent today. A repetition of this success might not always be possible for other men in different circumstances.

"PIGS FOR PROFIT."

Pig farmers will find much practical information of value in Bulletin No. 212, "Pigs for Profit." This bulletin is free and is available from your nearest office of the Department of Agriculture.

GARDENERS! Your own magazine, "The New Zealand Gardener," gives you, every month:

1. *Seasonal advice for every section of your garden.*
2. *Advance information on new plants, etc., tested at "N.Z. Gardener" Trial Grounds.*
3. *Free information service.*
4. *Technical information in everyday language.*
5. *Special section of Home Hints.*

"The New Zealand Gardener" is full of information to help you in your garden. Edited by J. W. Matthews, F.L.S., F.R.M.S. Price 1/- per month. Obtainable from booksellers or by annual subscription (12/- post free) from "The New Zealand Gardener," Box 2, Te Aro, Wellington.

Free sample copy posted on request.

SPEEDWAY STERILISER
BURNS OIL OR WOOD

Write for free illustrated catalogue to
SPEEDWAY PRODUCTS LTD
61 Albert Street, Auckland.

STEAM & BOILING WATER

SS-1-2

RAIL-AIR FREIGHT SERVICE

Direct Daily Communication Between Main Centres

●

New Zealand Railways' co-ordinated rail-air freight service now operates DAILY (except Sundays) between Auckland and Christchurch and between Wellington and Christchurch. Freight is conveyed between any railway station in either island to any railway station in the other island, over 1,200 off-airline points being thus served.

●

Ask Your Nearest Stationmaster for Particulars

Jason finds the Golden Fleece

YOUNG'S SHEEP DIPS

FAMOUS FOR QUALITY

One of the following Dips will suit your needs:-

RED LABEL PASTE
YELLOW LABEL PASTE
GREEN LABEL PASTE
SPECIAL POWDER
A.I. CONC. FLUID

A dip to suit every requirement

Obtainable from

Your local FARMERS' CO-OP. STORE

DRY-WEATHER GARDENING

SOME gardeners seem to have the knack of getting good results even on "hot" land and in dry seasons when others, on better land, complain that dry weather has ruined their crops. Lack of a constant and adequate supply of moisture in the soil through the growing season probably results in more failures and disappointments in the garden than any other single factor concerned with plant growth.

ALL plants are continually taking water from the soil into their roots, passing it up through the stems to the leaves, from which most of the water is thrown off as water vapour. The main purpose of this constant upward movement of water in the plant is to carry the plant foods taken from the soil up into the leaves and growing point where they are required. Some water is retained and used by the leaves as one of the raw materials from which they make sugar and starch.

The whole welfare of the plant is bound up in this upward movement of water, and healthy, rapid growth can occur only while the plant is able to take up moisture in the amount it needs. The actual volume of water which passes through a plant during its life is surprisingly large, as the following figures show.

It takes about 40 gallons of water to produce an average-sized cabbage. Planted at 2ft. by 2ft., a square yard would accommodate 2¼ cabbages. Therefore the roots of an average crop of cabbages remove from the soil about 90 gallons of water per square yard while they are growing. This is equivalent to about 15 cubic feet of water per square yard, or 20in. of rainfall. In the case of summer cabbage, most of this is taken up during the months when rainfall is lightest and when hot conditions are causing further rapid loss of moisture from the soil by evaporation from the surface. Garden operations should, therefore, be designed to encourage plants to form as extensive a root system as possible, so that the soil is fully explored and utilised. On the other hand the soil should be handled in such a way that it retains as much of the rainfall as is practicable (without getting waterlogged), and for as long a period as possible, to tide plants over dry spells.

[*Photo News Ltd.*

Another method of watering plants growing on a slope is to make a crowbar hole above the plant and to water into the hole.

[*Photo News Ltd.*

It is not easy to get water down to the roots of plants growing on a slope. A good method is to sink a deep tin (from which the top and bottom have been removed) just above the plant, and then water into the tin.

The ideal loamy soil, deep, well-drained, yet with sufficient clay content and humus to be retentive of moisture, comes nearest to meeting this prescription, and the gardener with a soil like this is indeed lucky. Much can, however, be done to keep plants growing in dry spells in any soil. The methods fall into three groups, (a) making sure that the soil absorbs as much winter rain as possible; (b) preventing losses during summertime, and (c) watering when necessary.

Catching Winter Rain

Deep digging probably does more than anything else to encourage extensive root systems and make it possible for the roots to go deeper into the lower levels which retain moisture for longer in the summertime. In shallow soils care must, however, be taken not to bring the lighter-coloured sub-soil to the surface, except in very small amounts at a time. When a soil is deepened by mixing sub-soil with the top soil, it is usually considered risky to bring up more than one inch of sub-soil at a time.

It is best to dig the garden in the autumn as soon as possible after the season's crops are cleared, as winter rains soak more readily into the soil after it has been dug. If, for any reason, digging in autumn is impossible, the surface should be roughly broken with a fork to enable rain to penetrate the soil. It is most important, especially after a dry season, that the sub-soil and lower levels of top soil should be adequately soaked during the winter.

Much badly-needed winter moisture will be lost through surface run-off, especially in gardens on a slope, if the soil is left with a hard surface through the winter. This applies particularly in between rows of brussels sprouts or on flower beds, frequently walked over through the autumn and winter for picking, where the surface becomes trodden hard. It is worth a visit to the garden when it is actually raining to observe the amount of water which can be lost by

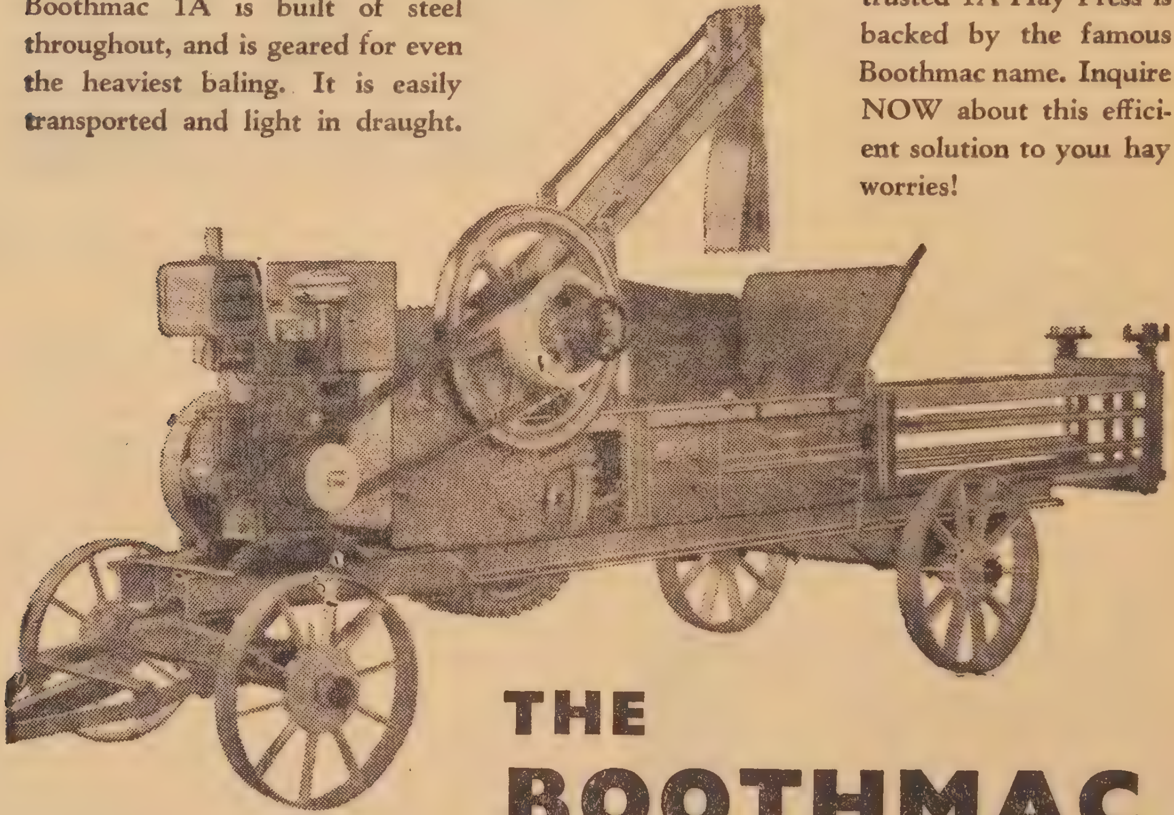
MORE HAY PER HOUR!

The Boothmac No. 1 A 4-WHEEL HAY PRESS

DELIVERS APPROXIMATELY 90 BALES PER HOUR.

Powered by the famous 6 h.p. Fowler 2-way Swirl Diesel Engine, or driven by your tractor, the Boothmac 1A is built of steel throughout, and is geared for even the heaviest baling. It is easily transported and light in draught.

Farmers! The tried and trusted 1A Hay Press is backed by the famous Boothmac name. Inquire NOW about this efficient solution to youi hay worries!



THE BOOTHMAC

No. 1A 4-WHEEL HAY PRESS

BOOTH, MACDONALD & CO. LTD.,

BRANCHES THROUGHOUT NEW ZEALAND

HEAD OFFICE: P.O. BOX 99, CHRISTCHURCH

run-off even on ground which is almost level. In an area from which water runs off the sub-soil probably never gets replenished with water throughout the winter, while some other area gets a double dose and may be locally waterlogged.

Organic matter of any sort (animal manure, compost, rotted leaves, old stack bottoms, etc.) can soak up and hold several times its own weight of water and prevent it from draining out of the soil. When plant roots develop they "help themselves" to most of this moisture. In a garden bed devoid of humus the amount of water which can be stored in the soil after a rain is low, and plants suffer in consequence when a prolonged dry spell follows. Heavy dressings of organic matter should be worked into the soil whenever practicable, especially in districts liable to drought. It is always best to dig organic matter into the soil in the autumn, to make sure that it is thoroughly wetted during the winter. By spring it should have absorbed as much moisture as it is capable of holding.

Conserving Moisture in Summer

Hoeing and surface cultivation during the spring and summer have always been considered, by practical gardeners, to be ways of conserving moisture in the soil. It has usually been claimed that hoeing achieved this object directly by breaking up the surface and leaving it loose, and indirectly by killing weeds. The loose surface layer of soil soon dries out, and has been supposed to serve as an insulating layer to prevent further moisture coming up from below and being lost by evaporation at the surface. Modern scientific research seems to throw some doubt on this explanation. It seems that the upward trend of water in the soil by the so-called capillary attraction is far less than has been supposed. Water moves fairly readily through the soil when it is really wet; but experiments have shown that water movement becomes much slower when the soil starts to dry out.

The fact still remains, however, that weed seeds will not germinate in loose, dry surface soil, and cultivation is still justified as a means of keeping weeds down if for no other reason. Weeds compete with the garden plants for water in the soil, and loss of moisture from this cause is far greater than many gardeners suppose. It is truly said that "the hoe is the gardener's best watering-can!"

Mulching consists of spreading a thin layer of some material over the surface of the soil to protect it from the direct rays of the sun, and also to prevent the sun from beating down on the soil and causing the surface to cake. Many materials can be used for mulching, those most useful to the gardener being strawy animal manure, leaves, compost, lawn mowings, or even plain straw, although the last-named is much more effective and easier to use if partly rotted beforehand. The material used for mulching gradually breaks down and is finally incorporated in the soil when it is next dug over. Mulches are best applied in late spring, by which time the soil has started to warm up. If applied in the winter or early spring, mulches tend to keep the soil cold and delay the early development of plants. In soils with a low reserve of nitrogen, mulches of raw straw or sawdust should be accompanied by a dressing of sulphate of ammonia at the rate of about ½oz. per square yard.

Watering as Last Resort

Finally, **watering** may be necessary as a last resort to keep plants growing healthily and without a check.

Growth of a plant is checked by lack of water long before there are visible signs of wilting, so watering should not be withheld until plants are seen to flag.

It matters little how the water is applied, by sprinkler, other system of irrigation, or watering-can, as long as it is correctly applied. It is wasteful and pointless to water "little and often," since this only wets the surface, where there are few or no roots, and then evaporates rapidly. No actual recommendations can be made regarding frequency of watering and amount to apply, since these will depend on the size of the plant and the nature of the soil.

As a guide, however, 4 gallons of water per square yard (approximately equal to an inch of rainfall), applied on a medium loamy soil which has not been allowed to get too dry first should penetrate 10 to 12in. and keep a crop of moderate requirement, such as strawberries, going for two weeks. The best guide to watering is the actual condition of the soil, which cannot necessarily be judged by kicking over a lump at the surface. It pays to take a trowel occasionally through the season and dig a hole 18in. deep to see whether or not the soil is still moist below the surface. A rough guide to its moisture content is given by squeezing a handful and then opening the hand, to leave the ball of soil on the palm. If the ball remains intact, there is sufficient moisture in the soil. If it breaks into one or two pieces, it has reached the critical point at which a further supply of water will shortly be needed if growth is not to be checked. If it crumbles when the hand is opened, there is not enough available moisture in it to provide the roots with their needs, and it should be watered as soon as practicable, even though the plants have not yet shown signs of flagging.

A few hours after watering the moistened surface should be stirred with a hoe or cultivator to prevent it from caking as it dries.

Cracking Causes Great Loss

When soil dries out it gradually shrinks in volume. Some types of soil, especially those which contain a high proportion of clay, start to crack when shrinkage goes beyond a certain point. This causes very great damage to plant roots, since all those which cross the plane of the crack are, of course, broken off. Moreover, cracking leads to a rapid increase in the rate at which soil moisture is being evaporated from the soil, since a greater surface area of soil is exposed to the air. The moisture conservation methods outlined above are especially important in gardens where the soil tends to crack during dry weather.

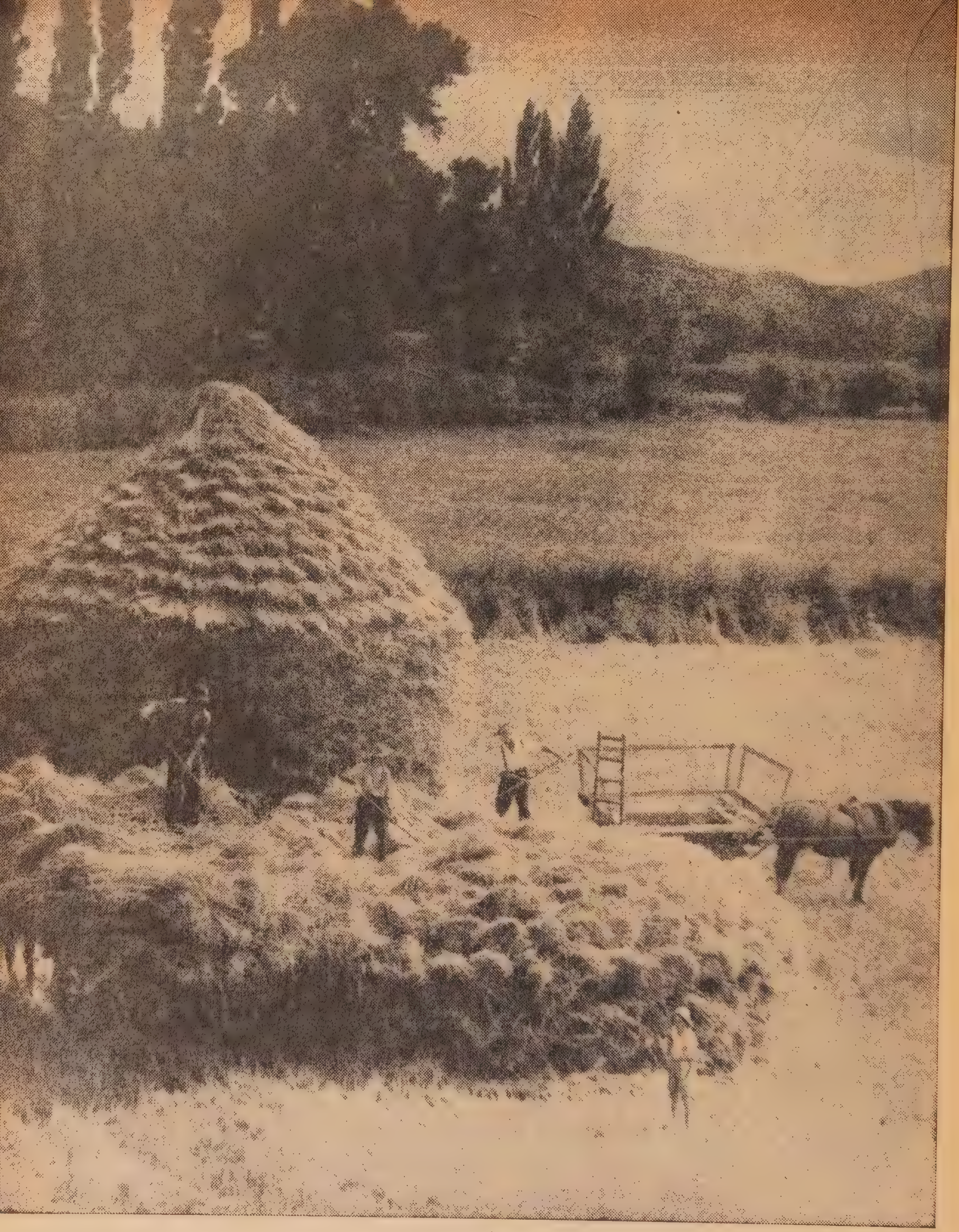
Conclusions

Plant roots are admirably designed for searching out and extracting moisture from the soil, and the annual rainfall in most parts of New Zealand should be ample to supply the plants' needs if it was all available to them; but a considerable proportion of the annual rainfall is lost in one way or another, mainly by drainage through the soil, by run-off from hard surfaces, by evaporation from the surface, and by loss due to weed growth.

Deep digging in early winter, breaking up hard surfaces, incorporation of organic matter, summer cultivation to keep down weed growth and prevent cracks, and use of a surface mulch in late spring will all help to conserve moisture in the soil where garden plants need it, and help to reduce watering.

When once a soil has become really dry it becomes difficult for water to move through it. This is well known by gardeners as far as it affects the surface soil, where the effects of watering can easily be studied, but it is equally true of the lower layers of soil. Heavy crops, especially in dry seasons, tend to dry out the lower layers from which the roots extract all the available moisture. It may take months in the winter for this dry soil to be thoroughly re-wetted by rain draining down through the soil, and, if the surface is left hard, leading to loss of rain through run-off, the sub-soil may still be relatively dry when the next season starts, instead of having its water supply replenished by winter rainfall.

J. P. HUDSON,
Horticulture Division, Wellington.



Stacking wheat in Marlborough.

[Downie Studios photo

A Marlborough Mixed Farm

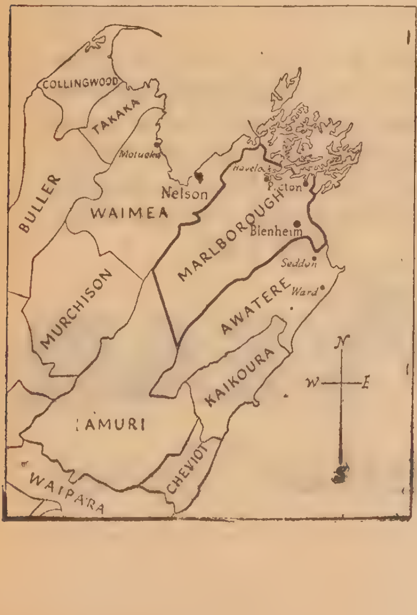
[Downie Studios photo.

By D. R. WILKIE, *Instructor in Agriculture, Blenheim.*

WITHIN the comparatively small area of Marlborough Province practically every type of New Zealand farm may be found. Marlborough producers apparently believe in having more than one string to the bow—a maxim not without merit in a world of uncertainties—and the merino sheep farmer with wide acres almost rubs shoulders with the small farmer owning only a few acres. Despite this variety, however, the total production is not insignificant. This often-forgotten corner of the South Island has an impressive record in many lines of production.

MARLBOROUGH Province consists of the Sounds, Marlborough, Awatere, and Kaikoura Counties, of which 2,277,535 acres is inhabited, the remainder being mountain tops and barren country. The arable land in this large area is relatively limited, consisting of

1. The Wairau Plain, where first-class to light land is to be found, the poorer country being at the top of the valley.
2. The Awatere Plain, once famed for the excellence of its oaten chaff, and consisting of medium to good land with rolling country toward the west.
3. Ward, where there is a small pocket of good arable land.
4. The Kaikoura Plain, which has an area of heavy country with light land adjoining; and
5. Sounds County, which is mostly hilly, with very small areas of ploughable land; parts are excellent sheep country, but other areas are reverting to second growth.



Soil Types

Marlborough soils are practically all alluvial and with a few exceptions are well drained. Close to Blenheim, which is the main centre, the soils are very fertile and are closely farmed. Generally, as a valley is ascended the soils become lighter and the holdings larger, until near the top the merino sheep country is reached. Many of the soil types have been found to be low in lime and they repay heavy applications. As in other parts of New Zealand there is a certain phosphate deficiency in the soils, and with reasonable rainfall excellent results can be obtained from topdressing with phosphate.

On a farming basis the land may be classified into three main groups. First, there is the sheep country, mainly light land carrying danthonia, sweet vernal, hairgrass, suckling clover, and similar species. Most of this country is held in large blocks and is associated with small areas of better land where fattening crops and improved pastures are maintained. Here also a small amount of cash cropping may be undertaken; this, however, is a departure from the normal, concerned more with the wartime aspect of farming. As a rule cash cropping is not undertaken to any extent. Wool and meat, store sheep and fat lambs, as well as a small but increasing amount of beef, are the products. These sheep areas cover more than three-quarters of the total area of Marlborough, and are of great importance in the prosperity of the province.

The second type of soil is the medium to light cropping land, consisting of the upper portions of the valleys and most of the Awatere area. On this country mixed farming is carried out. Many types of crops are raised, such as peas, wheat, barley, red clover seed, and grass seed, together with sheep and fat lamb raising. This country is not entirely suitable for wheat because of its light nature, but here again areas of wheat have been sown because of war conditions. It is expected that in future less wheat will be grown on this type of country. Recently subterranean clover was introduced on this land and has done exceedingly well. It is playing a big part in rehabilitating these soils, many of which are of lowered fertility because of excessive cropping. Crop yields vary as the land is free draining and the rainfall light.

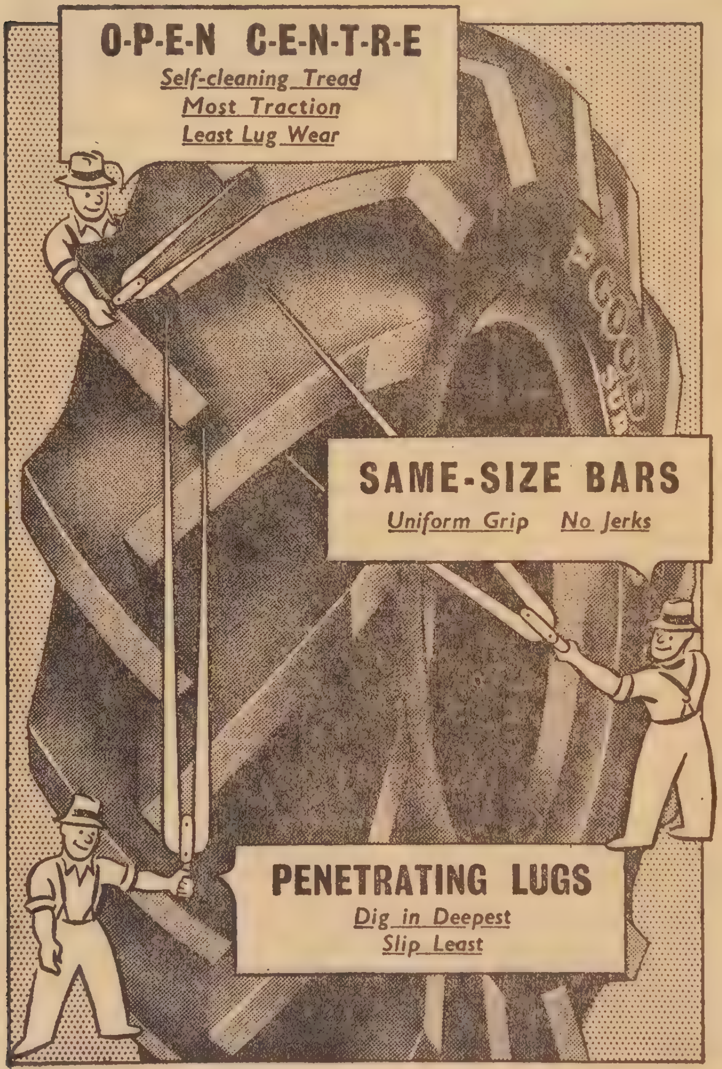
The remaining land is heavy and very fertile. It is capable of growing almost anything and is devoted to cropping, dairying, sheep raising, and small seed production, including most types of vegetable and flower seeds. In some areas market gardening is carried on. The land is more retentive of moisture than other types and carries on better during dry spells.

Within the confines of the province, therefore, practically all types of soil from the poorest to the best may be found. This fact

Tests Prove

YOU GET MORE WORK
—MAKE MORE MONEY

with this tractor tyre!


O-P-E-N C-E-N-T-R-E
Self-cleaning Tread
Most Traction
Least Lug Wear
SAME-SIZE BARS
Uniform Grip No Jerks
PENETRATING LUGS
Dig in Deepest
Slip Least
GOODYEAR SURE

In recent tests conducted by *impartial* farm experts, Goodyear's great Sure-Grip tractor tyre proved far superior in every way — proved it could make more money for any farmer!

Tested on all types of soil, the Sure-Grip's self-cleaning *open centre* tread pulled *heavier* drawbar loads than closed bar types, with *no* increase in slip. On plowing runs it did much more work—*up to 22% more* — using *less* time and *less* fuel!

You can see why. The *open centre* self-cleaning tread has lug bars unconnected at *both* ends. They penetrate easily, take firm hold in soil, slip less, give more pull than other type treads. With less slip you get minimum lug wear, and less time and fuel consumed.

You too will get more work done—make more money — when you fit Goodyear's Sure-Grip tractor tyres — *proved best in service* for traction, long life and economy.

REMEMBER — the same matchless experience that enables Goodyear to build the world's best tractor tyres also produces other superior rubber products for the farm — including CAR TYRES ● GIANT TYRES ● BELTS SPRAY HOSE

Goodyear Products are manufactured in Argentina, Australia, Brazil, Canada, Eire, England, India, Mexico, Peru, South Africa, Sweden, The United States. Branches, Distributors and Dealers throughout the world.

GOODYEAR

Sure-Grip Tractor Tyres

A MARLBOROUGH MIXED FARM . . .

may have a large bearing on the diversification of production which is a feature of farming in the district.

Climate

Marlborough has a large measure of sunshine and relatively mild winters, though frosts are fairly frequent and hard. Frosts averaging about 10 degrees may be expected during two months of the winter, but they are generally followed by warm clear days. The rainfall in Blenheim is about 23in. a year, but in the more hilly localities as much as 40in. may be recorded. The amount of rainfall appears to be of less importance than its incidence. In many seasons the fall may appear adequate, but its spread is not as even as is desirable. On the arable areas an average rainfall of about 25in. is experienced.

The first table below covering the period 1932-1943 gives more exact information about the climate of Blenheim.

This light precipitation, together with the uneven spread, is one of the factors limiting production. The combination of good drainage and insufficient rainfall in some years constitutes a problem which has caused crop losses. Except on the highest country, snow is practically unknown.

In summer the weather is warm, temperatures ranging between 70 and 90 degrees. In most seasons harvest conditions are good; at that time of the year rain is infrequent and, in the main, harvesting is completed by the end of February. The quality of the produce of Marlborough is of a high standard, largely because of the sunny climate and good harvest conditions.

The quantity of this produce is set out in the bottom table on this page.

A SPRING CREEK FARM.

On the heavier land the variety of production is great, and to give a more detailed account of the types undertaken the farm of Rose brothers, Spring Creek, has been selected. This farm consists of 216 acres of heavy land. It is described as a heavy silt loam, the bottom part of the farm (about 30 acres) being of a wetter nature. The soil is deep—about 40in.—and there is no sharp differentiation between top- and sub-soil. The land is inclined to lie wet and drains must be kept open or crop losses ensue; water furrows in crops are a necessity in most years for the same reason.

Compared with some Marlborough soils the land has a fair lime content, but can be considered to need a dressing of 1 ton an acre every second year. After rain the soil tends to set, but lime and ploughed-in plant material are used to obviate this. It is wise to keep the roller off this land as much as possible, as it is subject to packing with even moderate rolling.

The avenues of production are dairying, pig keeping, arable cash crops, pasture seed production, and sheep raising.

Cows, Pigs, and Sheep

A herd of 25 pedigree Jersey cows is kept. These cows are really the prop on which farm production rests. Crops may vary, but the cows are sure and can be relied on to maintain a flow of revenue throughout the year. The practice of having this sideline to cropping production is fairly general on this heavy land.

It has arisen partly because the area was subject to floods, the land having been built up by the Wairau River. As crops do not stand up to floods readily the alternatives crept in to keep farm income on a more even keel. In recent years, however, the floods have been more and more infrequent because of efficient stop-banking and river diversion. On this particular area floods are no longer expected, but the diversified farming remains. The stock are also kept for soil fertility, it being found that the land will remain in much better heart when cropping is alternated with pasture.

The dairy herd provides returns in the form of cream and stud stock, several beasts being disposed of annually. A few pigs are kept for sale and home consumption, and these use the dairy by-products, which are pumped to the piggery. Milking is done by machinery, electricity being laid on.

A small flock of sheep is carried, the number averaging 90 ewes; this provides meat, wool, and some fat lambs. The flock is largely a domestic concern—useful for cleaning up paddocks after cropping and providing some return.

All stock paddocks are watered. In this respect the farm is fortunate, having several springs and a creek running right through it. Where these are not available, troughs have been erected and water is pumped by electricity from an artesian bore.

Shelter for stock is ample, there being an abundance of trees, mostly poplars and willows, as well as an extensive system of hawthorn hedges.

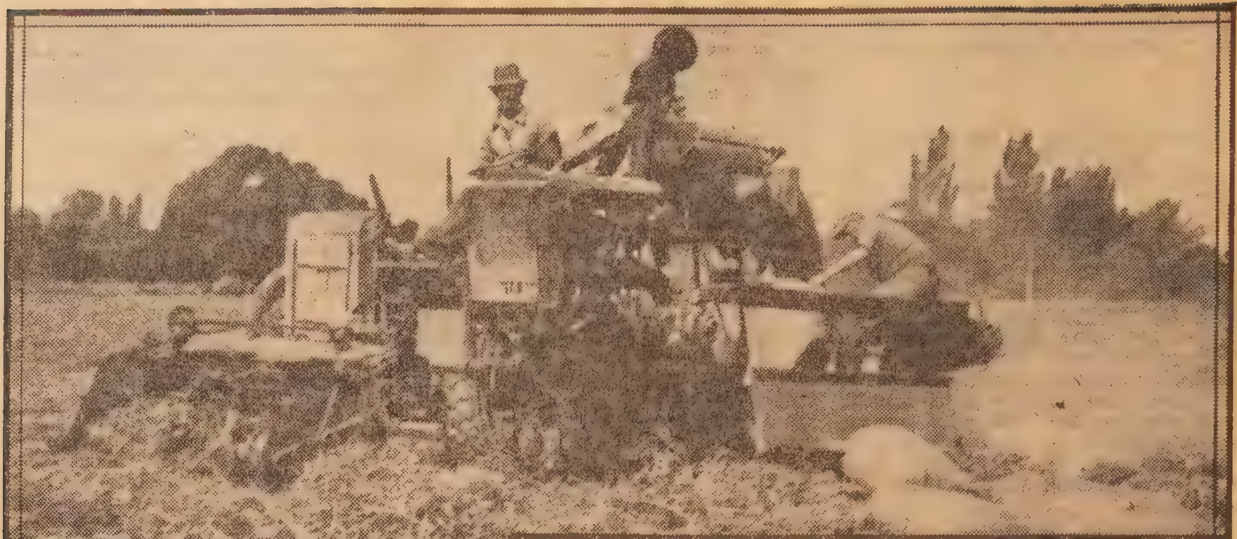
CLIMATE IN BLENHEIM DISTRICT

	Mean temperature (degrees F.)	Mean daily maximum temperature (degrees F.)	Mean daily minimum temperature on grass (degrees F.)	Bright sunshine 1914-1943 (hours)	Rainfall (inches).
January ..	64.7	75.8	47.8	248.4	1.61
February ..	64.4	75.0	48.4	212.8	2.25
March	61.1	72.1	44.2	202.7	1.42
April	56.1	66.6	39.4	168.8	1.73
May	49.3	59.7	32.7	162.7	2.35
June	44.8	55.0	27.9	143.2	2.04
July	43.0	53.0	26.7	148.5	2.30
August ..	46.1	56.0	29.5	175.0	2.21
September ..	50.2	60.0	33.8	189.7	2.37
October ..	54.3	64.5	37.4	207.8	2.13
November ..	58.1	69.1	41.1	230.8	1.45
December ..	63.2	74.6	45.9	225.2	1.69
Year ..	54.7	65.2	37.9	2315.6	23.55

PRODUCTION IN MARLBOROUGH

	1939-40.		1940-41.		1941-42.		1942-43	
	Area Threshed.	Average Yield.	Area Threshed.	Average Yield.	Area Threshed.	Average Yield.	Area Threshed.	Average Yield.
Wheat ..	6062 acres	35.00 bushels	8138 acres	33.02 bushels	8081 acres	35.48 bushels	11,247 acres	30.46 bushels
Oats	1172 acres	44.25 bushels	1000 acres	34.63 bushels	580 acres	38.54 bushels	436 acres	36.09 bushels
Barley ..	3484 acres	41.87 bushels	3486 acres	34.98 bushels	3858 acres	34.98 bushels	2384 acres	36.04 bushels
Peas	5495 acres	30.90 bushels	7915 acres	24.89 bushels	7911 acres	27.13 bushels	5971 acres	24.89 bushels
Per. rye ..	256 acres	347.79lb.	775 acres	256.35lb.	1089 acres	203.78lb.	607 acres	202.72lb.
Red clover	713 acres	188.18lb.	1948 acres	176.88lb.	2453 acres	192.51lb.	1463 acres	177.73lb.
White clover	73 acres	101.56lb.	634 acres	134.56lb.	757 acres	145lb.	680 acres	122.99lb.

IN THE MARLBOROUGH DISTRICT



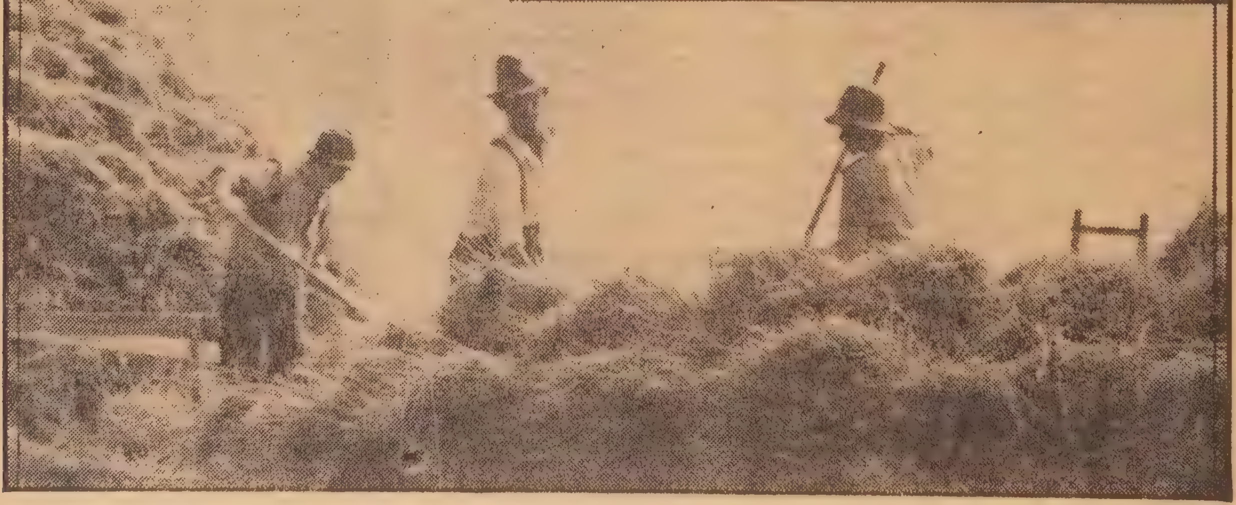
Above—Harvesting peas with a pick-up header.

[Downie Studios photo.

Right—Aerial view of Wairau Plain (Blenheim in background). Part of Rose brothers' farm in right middle distance.

Below—Stacking Certified wheat.

[Downie Studios photo.



Cropping Programme

The basis of the cropping programme is the growing of garden peas for seed, malting barley, wheat, and oats for both chaff and grain. In addition several areas are shut up annually for white clover seed, to which crop the locality is particularly suited. Red clover is also a favoured crop, providing good cuts of hay and usually an excellent seed crop. High-quality grass-seed production is carried on in years when feed supply is abundant.

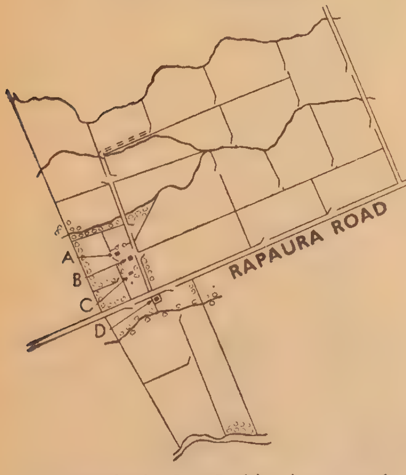
Importance of Fertiliser

The farm is divided into 27 paddocks with an average size of 8 acres. About 17 acres is occupied by creek, drains, and springs, and 63 acres, cut into seven paddocks, is in pasture. These pastures remain down for eight years and are then ploughed up to work in with the cropping rotation. Certified Pedigree perennial ryegrass and Certified Permanent Pasture white clover are sown.

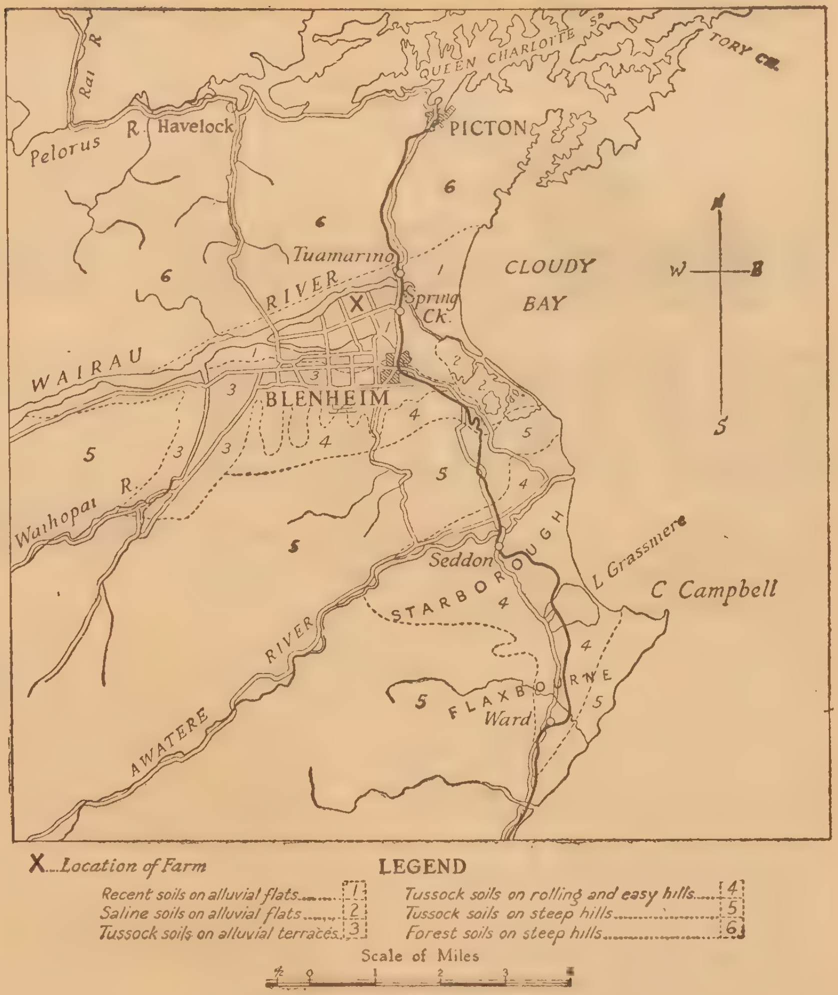
A significant feature of pasture growth on this land is that, though the sward will remain in good condition almost indefinitely if adequately topdressed with superphosphate and lime, without topdressing the pasture will be almost run out at the end of three years. The wartime reduction of superphosphate supplies has had a serious effect on pasture, the quality of which is not comparable to that of pre-war years. Before rationing of fertiliser 1¼cwt. of superphosphate an acre was topdressed on all pasture every year, and in some years a double topdressing was done, half in the autumn and the remainder just before the spring growth started.

An experience during the depression emphasises the role that phosphate applications play. In the interests of economy it was decided to omit the topdressing of pastures for one year. All swards went back very rapidly, showing a distinct tendency to dry out in the summer, and hairgrass and other inferior grasses soon showed up in the pasture. Topdressing was restarted as soon as possible, and pasture which seemed to be fit only for ploughing recovered and produced good growth for the seven years following. That was a true example of false economy.

PLAN OF FARM


RAPAURA ROAD
A
B
C
D

A—Cowshed. **B**—Stable, barn, and implement shed. **C** and **D**—Homesteads.


Rai R
Pelorus R
Havelock
QUEEN CHARLOTTE SD
TORY CH
PICTON
Tuamarino
CLOUDY BAY
W
E
S
Spring Ck.
X
WAIRAU RIVER
BLENHEIM
Waihopai R.
Seddon
STARBOROUGH
L. Grassmere
C Campbell
AWATERE RIVER
FLAXBOURNE
Ward
1
2
3
4
5
6
X...Location of Farm
LEGEND
Recent soils on alluvial flats 1
Saline soils on alluvial flats 2
Tussock soils on alluvial terraces 3
Tussock soils on rolling and easy hills 4
Tussock soils on steep hills 5
Forest soils on steep hills 6
Scale of Miles
0
1
2
3

Returns from Pastures

Pastures are grazed principally by cows and young stock totalling 40 head. An average of 90 sheep and four working horses is also carried on this area. The cows are milked all the year round, and in addition to pasture growth they are supplied with clover hay for four months in the winter. The sheep are carried partly on the pastures and white clover paddocks, and are also used to clean stubble paddocks after cropping. Lambs, fat off the mothers, are sent to the works and store lambs are then bought in and fattened on pea and clover stubble.

Apart from the hay and grazing, these pasture paddocks supply a cash return from seed crops, but though this revenue is welcome, it is not to be expected every year. The seed crop depends entirely on the season and the available feed supply. Perennial ryegrass seed of the Mother seed class is saved, as all paddocks are sown with Pedigree seed. The average yield is approximately 15 bushels an acre. The crop is mown and picked up with a header. The pick-up baler is used to collect the straw when that machine is available; otherwise it is stacked.

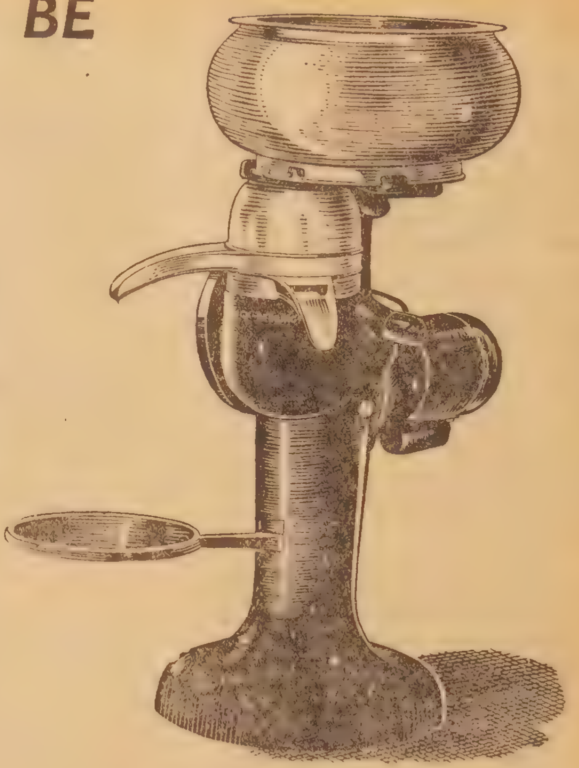
White clover yields vary from half a bag to three bags an acre. When the season is dry and hot the yield tends to be better. Though a fair percentage of the white clover on this type of land is a volunteer growth, it is of reasonable quality, and year by year the produce of this farm has been certified as Permanent Pasture seed. A good year with white clover on this country represents a very profitable return when

SOME FARMERS WILL BE

Lucky!

McCormick-Deering
SEPARATORS

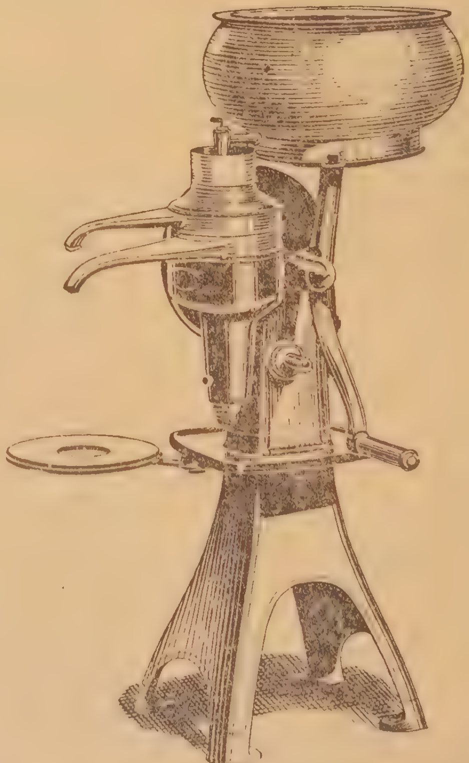
AVAILABLE IN LIMITED QUANTITIES



These separators are the efficient, feature-packed jobs you would expect from an internationally famous farm machinery organisation who have consistently led the separator field ever since they gave farmers the first fully-equipped ball-bearing separators.

The sturdy separator at the bottom is the Model 3 in 75-gallon and 90-gallon sizes. It has stainless steel bowl and discs, runs smoothy and quietly, and skims closely. It is available with electric drive from an electric motor that attaches simply and compactly.

The streamlined beauty at the top is the Model S in 50 and 125-gallon sizes. It's the last word in separator design. The flowing lines conceal a mechanical design with startling new features that assure perfect separating and make cleaning and washing a simple, quick business. New "splash-oiling" lubrication means longer life and easy turning. Both models are available with a direct electric power drive that requires no belt. The motor becomes part of the separator unit.



McCORMICK-DEERING MILKERS

Both the high line and low line, low and constant vacuum models are available, and McCormick-Deering's designing genius and manufacturing skill make them outstanding machines. The low and constant Vacuum not only overcomes the harmful effects of high vacuum, but makes an efficient job of milking that stripping is unnecessary.

SEND THIS COUPON NOW

INTERNATIONAL HARVESTER CO. OF
NEW ZEALAND LTD.,
P.O. Box 563, Christchurch.

Please send me full details of:—

Separators 50-gallon
75 „
90 „
125 „

Milking machines.

Mark with (x) those interested in.

NAME ....

ADDRESS ................................A.J.

it is realised that the paddocks may be grazed for eight months of the year.

Peas an Important Crop

Peas are one of the main crops grown on the farm, and usually about 30 acres are sown in the spring. The wrinkled or garden pea is always raised, and for the past seven years the variety Onward has been grown; before that Greenfeast was the favourite. Land for peas is ploughed in August or September, and usually broken out of pasture. In working down tandem discs are the main implements used, the object being a seedbed which is not too fine—similar to that necessary for autumn-sown wheat.

Deep ploughing is not favoured, and for peas the furrow depth is not more than 5in. This practice originated seven years ago. Before that pea land was ploughed to a depth of 10in. or even more. One season, however, the strike outs were not split and consequently the land under the first furrow was cultivated to only 4in. from the top. Here the crop proved much superior on every strike out, and thus the practice of shallow ploughing for peas originated on this farm. It has since been persisted in with good results.

As well as being sown on lea land, peas are also drilled after wheat, the straw of which is ploughed in and worked as for lea land. The land is then drilled to peas in the spring. Care must be taken to see that the seedbed is not too firm, as this land is inclined to pack, resulting in very poor strikes. Consequently the use of the roller is restricted as much as possible.

Seed is sown at the rate of 4½ bushels an acre with 1cwt. of superphosphate. It is drilled 2 to 3in. deep, with the harrows following the drill. When the crop is just coming through, special light spring-steel harrows are brought out and the paddock is harrowed twice for weeds. The usual harvest method is to cut with the mower and pick up with the header.

The average yield for peas during the past five years has been 43 bushels an acre, and all crops are grown under contract at prices fixed each year. Peas are considered one of the basic crops, and the quality of the Marlborough crop is high.

Wheat, Barley, and Oats

Another crop grown every year is wheat. About 30 acres is used for this purpose annually, the varieties being either Cross 7 or Dreadnought. The wheat is usually autumn sown, but may be drilled in the spring if the land is dry enough. Ploughing for wheat is 8in. deep and the crops are almost always direct headed. The expected yield is 40 bushels, with good yields as high as 80 bushels.

Fifteen acres is given over to the production of malting barley, the varieties being Plumage-Archer and Chevalier. These varieties are expected to yield 50 bushels an acre, though yields of up to 90 bushels are not unknown. All the barley is spring sown and is drilled in September or October with 1cwt. of superphosphate. If possible the barley is windrowed and picked up with the header, but the method of harvesting depends largely on conditions. Sometimes it is direct headed or the binder has to be used.

Algerian oats are grown for chaff and an average yield is about 3 tons an acre. At one time a large area was devoted to oats, but, as on many other farms, this has receded with the introduction of power farming. At present about 10 acres of oats are grown—only sufficient for the horses kept, with a small surplus for sale.

Clover Seed Production

Red clover is sown in either spring or autumn, with a cover crop of oats or barley. The cover crop is sown first and after it has struck the clover is broadcast at 5 to 6lb. an acre. The paddock is then harrowed, this process weeding the oats and covering the clover in one operation. In a good year seed may be harvested in the same season after the cover crop has been cut, but usually clover seed is not expected until the second season. Yields vary between one and a half and three bags an acre.

White clover when sown is established by similar methods; 3 to 4lb. an acre is the seeding rate.

Power and Equipment

This farm has a truly mixed production and quite an array of plant is necessary for its successful operation. There is a 40-horsepower tractor, and the range of implements consists of ploughs, discs, cultivator, roller, harrows of various sorts, mowers, binder, side and dump rake, drill, topdresser, and spring cart. Four working horses with drays and wagon are kept for carting and sowing.

Buildings consist of a large barn with stables and implement shed attached, cowshed with three-cow plant, and piggeries. Farm work in normal times is done by two men and one boy. In autumn and winter a large amount of ditching must be done on this land, as it is essential that drains be kept open. All are surface drains and require annual attention. Hedges, mostly hawthorn, also need trimming at intervals.

Crop Rotation

In common with many other farms, the crop rotation may be varied with the conditions, but a general idea can be given. After grass the land is ploughed shallow and sown to peas. If the crop is particularly good, peas may be sown again in the same paddock, after which the land is drilled in wheat. The next crop may be either oats or barley, with red or white clover sown in the bottom. The clover stand is retained for an average of two years and the paddock may then be sown again to either peas or wheat. The following year the land is once more sown to grass, which remains down for eight years. This gives a fairly long rotation, which has proved quite satisfactory on this farm.

With the varied avenues of production undertaken on this farm, complete failure in all lines is practically unknown, but complete success in every venture in any one season is equally unlikely. Usually there are some production avenues which will be excellent and others only fair, so that year in and year out the income is fairly stable.

Farmers on this type of land in Marlborough contend that this is the best method of "safe farming". —a large number of types of production with not too great expectations from any one type.

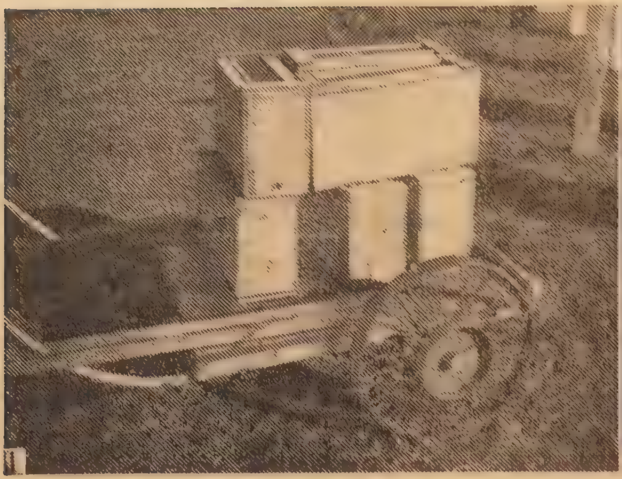
Acknowledgments

Thanks are expressed to the Lands and Survey Department for drawing of maps, and to the Soil Survey Division of the Department of Scientific and Industrial Research for data on Marlborough soils.

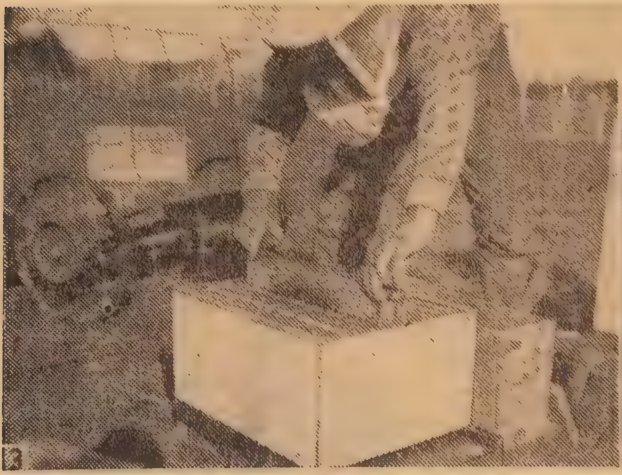
Avoid scouring in your Calves by giving them Vite-ADee FISH LIVER OIL

It replaces the Butterfat Vitamins that are lacking in skim milk and whey

ESTABLISHMENT OF NUCLEUS HIVES



Left—The nucleus arrives at the apiary. Right—Alongside the hive which will be the bees' home.



Left—Transferring the nucleus from the travelling cage. Right—Six nuclei well established with surplus honey ready to be extracted.

Left—Well-filled combs drawn out from sheets of comb foundation. Right—Nuclei established in autumn ready for making increase or providing replacements in spring

The Value of Nucleus Hives in the Apiary

By C. R. PATERSON, *Apiary Instructor, Hamilton.*

EACH honey season more beekeepers realise the value of nucleus hives in apiary management. Serious decreases in production can be averted if sufficient foresight is shown in establishing a number of these small but very valuable colonies which can be used to replace losses of established colonies. With a knowledge of queen rearing, nucleus hives can be made up by individual beekeepers in the early autumn. At this time young queens mate readily, and surplus brood and bees are usually available from established colonies.

THIS article deals not with methods of establishing nuclei, but with the records of six nucleus hives procured by an established beekeeper and kept under close observation during the past season.

History of Hives

These hives were made by the vendor in the autumn of 1944 and were given queen cells from a good strain of Italian bee. A final inspection before winter set in showed that the queens had mated and ample stores were available. In September one full frame of honey was given to each nucleus hive. Before delivery in the first week in October each queen was branded with an identity disc so that the purchaser could immediately see if supersedure had taken place at any time.

Stores at that time were very low, but the beekeeper had ample feed available, and preferred brood and bees to honey. The nucleus colonies were therefore caged in a travelling hive with a wire screen on top and screened ventilation holes at the side. They comprised three frames containing mostly brood and a fourth containing pollen and honey. Young bees filled the box without crowding. After travelling all day for 140 miles by train they were picked up next morning by the new owner and transported to his apiary.

Method of Establishment

The weather at the time was most unfavourable, with cold winds prevailing. To allow the bees to settle down before transferring them to proper hives, each nucleus was placed as shown in Fig. 2. The wire screen covering the small hole in the end of the travelling box was removed in the evening so that as little disturbance as possible was caused to the hives already established in the apiary. After a day in that position the new bees had orientated themselves and become familiar with the white-painted hive beside them. Fig. 3 shows the transference to their permanent home, which caused little excitement, as the bees readily accepted the new entrance.

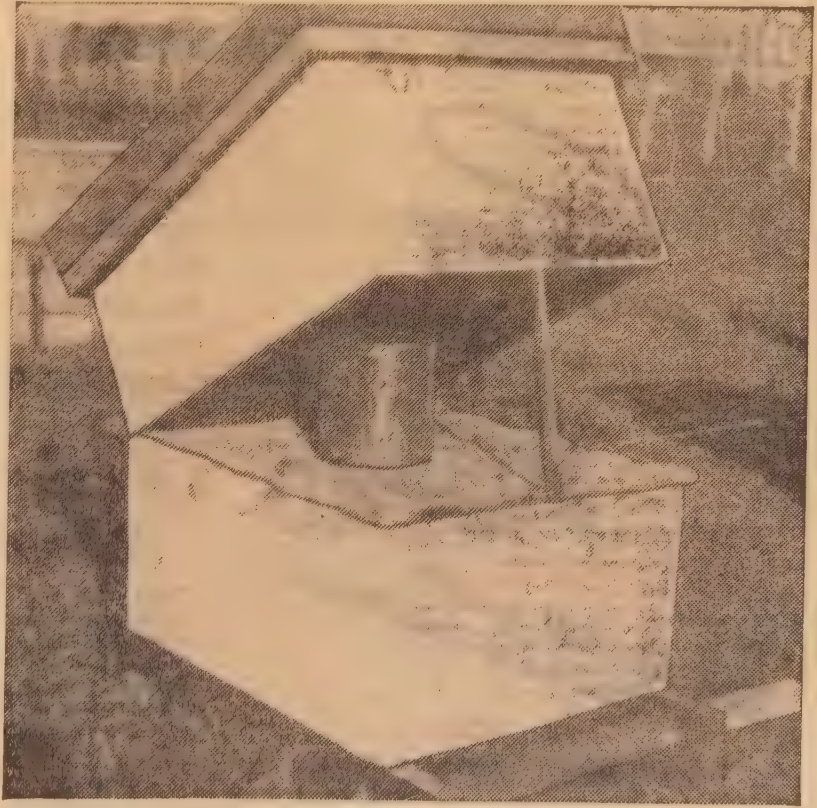
The same evening a 5lb. tin of supplementary feed was given to each hive, and that was repeated a week later when the nuclei were well established and working busily on spring flora. By that time the weather had improved considerably. From that stage until Christmas very little attention was necessary except the placing of extra supers on the hives with frames of foundation as required. Six drawn-out combs were used when the nuclei were first transferred from the travelling cages.

Fig. 4 shows the same hives fully established with a surplus of honey gathered by the bees and ready to be extracted. Fig. 5 indicates the work that had been done and the type of combs built by the bees.

Heavy Crop of Honey

In May the hives were found to be well supplied with winter stores. The owner had found no hive management necessary during the season. From these 4-frame nuclei, established early in October, an average of 140lb. of surplus honey was extracted. That yield was exceptionally good as conditions were ideal for a heavy nectar yield.

The part that a strong nuclei headed by good queens may play in apiary management was thus clearly demonstrated. As a result of this experience the beekeeper studied queen rearing and, as Fig. 6 shows, he now has a supply of nucleus hives to assist his honey crop for next season.



Method of feeding by a press-in lid tin

FREE!
ELECTRIC POWER

•

INSTAL A "WINCHARGER"
Use the wind to charge all your Batteries.

•

For particulars write

TRICITY HOUSE
Box 1410, Christchurch.

SPEEDWAY

LOW & HIGH PRESSURE
OIL BURNING BOILERS

Write for free illustrated catalogue to:
SPEEDWAY PRODUCTS LTD
51 Albert Street, Auckland.

SB-1-2

NO LICE OR TICKS CAN LIVE WITH **OSMOND'S**

VIPER *Powder Dip with Derris*

You can be sure of Viper's Killing power. You can be sure, too, of a thorough penetration of the fleece, for finely ground Viper mixes readily with cold water and is evenly distributed throughout the wool. Dip with care . . . it pays dividends.

manufactured by
Osmonds
THE FIRM WITH THE 90 YEAR OLD REPUTATION

Agents and Stockists Everywhere.

V.20

OSMOND & SONS (N.Z.) LTD. P.O. BOX 460, WELLINGTON.

ORCHARDISTS • FARMERS • GARDENERS

Spray

"Black Leaf 40"

The World's most Reliable Insecticide

The strength of Black Leaf 40 never varies. That's why it is your surest and most economical defence against aphis, slugs, codlin moth, bud moth, red bug, leafhoppers and other plant and fruit pests—killing by contact and by fumes. Black Leaf 40 does not burn foliage and combines ideally with other sprays for special work. Full directions on the packet. A little makes a lot of spray.

FARMERS!

"Black Leaf 40," is unrivalled as a drench for eradicating stomach worms and tape worms in sheep and lambs. Use as directed with Bluestone or Nicotine Bluestone Cobalt.

POULTRY KEEPERS!

"Black Leaf 40," kills poultry lice and feather mites safely and effectively.

DON'T JUST SAY NICOTINE SULPHATE . . . SAY "BLACK LEAF 40."

SOIL MANAGEMENT IN THE ORCHARD

Benefits of Mulching

By **S. FREW,** *Orchard Instructor, Blenheim.*

ONE of the most contentious subjects with which the fruit grower has become concerned during recent years has been the management of the soil. Should orchards be maintained under clean cultivation, in grass, or under mulch? All methods have their advocates. Though the grass orchard has proved unsatisfactory in New Zealand in normal circumstances, the clean-cultivated orchard, though most general in New Zealand today, also leaves much to be desired in many localities. In some instances the solution may be to adopt the system of mulching; this method is certainly worthy of full investigation and consideration by growers who are not entirely satisfied with their present soil management.

THE term "mulch" as applied to the orchard has a wide interpretation, and anything from mowing sparse grass and allowing it to lie where it falls to spreading straw or other material to a depth of several inches or a foot has been designated as mulching. The true mulch system, however, is as different from grassing in its biological results as grassing is from tillage. The fact that practically all the growth between the trees is destroyed or suppressed, together with other physical and biological effects, places this system in a category by itself.

The fundamental of a true mulch is that the vegetable matter which is applied to the land is introduced, not grown on the area. Thus nothing is taken out of the ground to obtain a mulch, and there is no drain on the orchard soil's moisture or fertility in producing this material. The disadvantages of a false mulch from the growth on an orchard under grass are therefore eliminated.

Establishing a Mulch

Mulching consists of depositing a large amount of straw or other vegetative material over the whole of the soil surface, which should first be well cultivated and in good tilth. It is preferable that the work be done during the dormant season, ensuring suppression of weed growth, prevention of moisture evaporation, and maintenance of the soil in a good physical condition. The cover should be complete, as a partially-mulched area would become merely a partially-neglected area. The mulch is permanent, and is added to from time to time to ensure that the straw layer is maintained. In some places the practice is to disc in the rotting straw each autumn and lay a fresh supply on the newly-cultivated ground. The other method is to refrain from cultivation at all, merely adding straw as required, but once this system is firmly established it is unwise to revert to cultivation, as the tree roots would have travelled very near the surface and even quite shallow tillage would damage them.

Wheat straw spread 1ft. deep over the whole of the Marlborough cherry orchard shown in the two illustrations on this page makes an excellent mulch.

The mulching system has been severely criticised in the past because it was widely believed that all plants would do better if cultivated. But the disadvantages of clean cultivation in some districts have become so pronounced that other methods must now be considered. In warm districts where orchards are on light soil and susceptible to drought the necessity for some means of both shading the ground and preventing rapid evaporation has become increasingly apparent; in other localities erosion is becoming a major problem. There is no doubt that these difficulties can be overcome only if the practice of clean cultivation is modified. Only two methods of overcoming these problems are known. One is by the growing of cover crops and the other is by mulching.

To some extent cover crops provide the answer, especially in cases of erosion, where permanent cover crops might do much to alleviate the movement of topsoil. But in a drought-susceptible area, where not only is growing a cover crop difficult because of lack of moisture, but also whatever crop is grown tends to absorb more moisture from the ground than it saves in its function as a shade plant, mulching seems to offer the best alternative, and one which in some circumstances at least appears to be more effective than clean cultivation in many ways.

Effects of Mulching

In one Marlborough orchard last season an acre of Delicious apple trees was mulched with wheat straw; the rest of the orchard received clean cultivation, applications of fertiliser, and irrigation during the dry summer months. The trees in the mulched block showed marked superiority in all respects over the rest of the orchard. The foliage was larger, darker, and of better texture, the crop was heavier, with the fruit of better size and brighter colour, and the annual wood growth was stronger. Wherever the straw mulch was lifted for inspection the soil appeared cool and moist, though in spite of irrigation the rest of the orchard continued to have a parched appearance. This

GROWERS WANTED FOR SEED BEANS

To meet the expanding demand for quality N.Z. grown Beans, we want further areas to contract in mild districts mainly Poverty Bay, Hawke's Bay, Nelson and Marlborough.

Reasonably small areas from half acre up to ten or twenty acre blocks are required.

Many types are available and contract rates have never been higher—no price gamble.

Beans (being legumes) build up your soil fertility.

Get in touch now with our local representative for your district.

Grow with security with New Zealand's Leading Seed Growers.

ARTHUR YATES & CO. LTD.

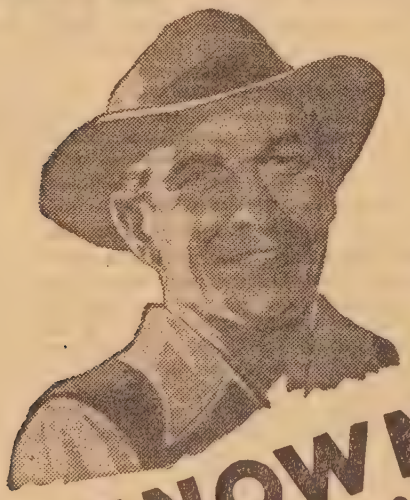
Head Office: Box 1109, Auckland.
Telegrams. "Seedsman."

Local representatives for seed cropping.

POVERTY BAY—Common Shelton & Co. Ltd., Gisborne.

HAWKE'S BAY—Turners (H.B.) Ltd., Hastings.

NELSON and MARLBOROUGH — A. Yates & Co. Ltd., Branch Office, Blenheim (Rep. H. F. Ching).



"YOU DON'T HAVE TO SELL ME ON A RENOWN JACK PUMPING SYSTEM — I HAVE ONE!"

The Renown Self-Oiling Jack Pump is probably the most popular pump in New Zealand to-day. Over 6000 are in use. There must be a reason.

For illustrated catalogue and full particulars

RENOWN
SELF-OILING
JACK PUMPS
and AUTOMATIC PRESSURE SYSTEMS
Are Manufactured by
W. H. PRICE AND SON LTD.
34-36, Manchester St., Christchurch.
Established 1879.

Stockists in all centres.

POST THIS COUPON

W. H. PRICE AND SON LTD.,
P.O. Box 1084, Christchurch.

Please send me full particulars of the "RENOWN" Self-Oiling Jack Pump and Automatic Pressure System.

Name ....

Address ....

.... J.A.

of course is the experience of only one year, but there seems to be no reason why this superiority should not be maintained.

American experience with this type of soil management tends to confirm this supposition. The results on an experimental area in Ohio during 10 years have been greatly in favour of the mulched orchard as compared with clean cultivation. Soil analysis has shown that beneath an established mulch a carbon-nitrogen balance is attained, and nitrates become available to the tree in such large amounts that applications of nitrogen fertilisers have been considerably reduced.

Observations of potash beneath a mulch are also interesting. Potassium being water soluble in plant material apparently leaches out of the mulch material and accumulates in the soil to a surprising extent. Where no potash fertiliser had been applied to the orchard there was a content of approximately 1000lb. an acre at a depth of 24in. beneath a mulch, compared with 175lb. an acre at the same depth between adjacent rows of trees which had been continuously cultivated.

Organic matter was much lower in cultivated orchards, even where cover crops had been used. Obviously organic matter is depleted by constant cultivation, and accumulates in fairly large quantities beneath a mulch.

Cost of Straw a Big Factor

Is mulching practical and economic? The answer in some districts is definitely "No." A well-mulched orchard necessitates the use of a substantial amount of straw, and the prerequisite of this system is therefore an abundant supply of cheap material. For orchards near wheat-growing districts, however, this method should be both practical and economic. All this material at present is considered a waste product by the wheat farmer, and the burning of stacks is a common sight after harvesting. This wheat straw can often be obtained for the cost of sweeping and baling (about 7d. a bale) and the maximum cost delivered to the orchard should not exceed 10d. a bale or, at 35 bales to the ton, £1 10s. a ton. To ensure a good mulch say 1ft. deep, about 6 tons, costing £9, would be required for 1 acre.

In districts not so favourably situated for supplies the price would be considerably greater, and the cost of wheat straw at perhaps £2 10s. a ton might prove excessive.

The comparatively moderate outlay of £9 an acre is worth consideration. A saving in the cost of normal cultivation would go a long way to offset this and some advantages which mean an indirect saving would also be achieved.

Three bales of straw to each tree are distributed ready for spreading as a mulch in the orchard shown in the illustrations on this page.

Advantages and Disadvantages

The advantages of a mulch can be summarised as follows:—

1. **Improved condition of the trees;**
2. **Better retention of moisture in the soil;**
3. **Reduction in the amount of fertilisers required;**
4. **Improved physical condition of the soil;**
5. **Improved size and colour of fruit;**
6. **Less injury to windfalls;**
7. **Trees can be sprayed immediately after heavy rains, when it would be impossible to operate a spray pump over cultivated ground; just how advantageous this would be is well known to growers, especially in a district prone to black spot infection;**
8. **Prevention of erosion.**

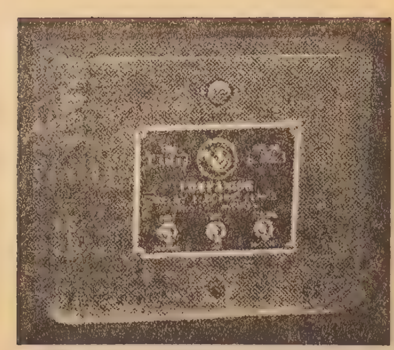
No system is without disadvantages, and, apart from the cost, mulching an orchard creates one decided disadvantage which might prove serious—the danger of fire. During a hot summer when everything was tinder dry protection from fire would call for great vigilance.

Control of Erosion

Even where complete mulching of an orchard is undesirable or uneconomic, the laying of strategic strips may solve the erosion problem. There are places in many orchards where the land slopes in such a manner that after rain water tends to accumulate and flow in one direction. If this run-off can be held to a slow rate, all is well. Something is needed that will equal the effect of grassing to a considerable degree but not dry out the soil. A thick mulch of straw is very effective in slowing up movement of water over the surface of the land.

One principle of its use, however, is of the greatest importance. The mulch should be applied before scouring has occurred and at points where the movement of water begins. To apply such light materials where the water will become deep or move in great volume or force is of no value. The mulch will merely float away. If the mulch is placed in strategic strips at the initial point, an ideal cover to prevent erosion is the result.

There is a case for mulching in certain circumstances, and the fruit grower who lives in a wheat-growing district, when next he sees his neighbour's stack of wheat straw being burned, might well ponder over this waste of potential mulch material and consider the possibility of making a deal advantageous to both the farmer and himself after next harvesting season.



Invest in the New

"COMPANION"

RELAY ELECTRIC FENCE

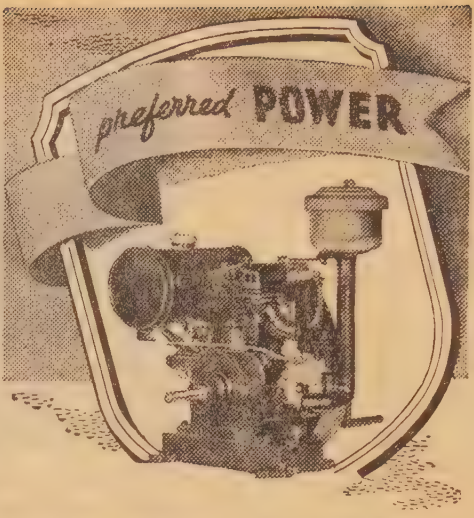
The latest, safest, and most efficient Electric Fence obtainable. Completely insulated to ensure maximum output.

Price £10/17/6. Or on easy terms.

Write for detailed illustrated leaflet.

JOHNS LTD.

23 Chancery St., Auckland. Box 471.
Also at King St., Pukekohe.



BROWN BROS
ENGINEERS LTD.
PUMPING MACHINERY SPECIALISTS

590J Colombo Street,
CHRISTCHURCH.
P.O. Box 548J.

4 CYCLE
BRIGGS & STRATTON
GASOLINE ENGINES

There's no engine like a Briggs and Stratton. Many B. & S. engines now in daily use in New Zealand are over ten years old! If your engine is one of these watch maintenance regularly and replace any worn parts. This will ensure trouble-free performance every day of the year.

●

As sole New Zealand distributors for this unique 4-cycle petrol engine, we carry a complete range of spare parts. When enquiring for spare parts—state model number, type number and horsepower.

- A few models of Briggs & Stratton petrol engines will shortly be available ex stock.

For Better Planning—specify only

K.P.
RGD. T.M.

HIGH-GRADE FERTILISERS

Made in N.Z. to suit ALL N.Z. soil needs!

Manufactured under strict scientific control at completely up-to-date chemical works at—
AUCKLAND—WANGANUI—CHRISTCHURCH—DUNEDIN
By—

KEMPTHORNE, PROSSER & CO.'S N.Z. DRUG CO., LTD.

Look For The "K.P." Brand on YOUR Bags.

THE CARROT CROP IN NEW ZEALAND

By **A. C. BURGESS**, *Instructor in Agriculture, New Plymouth.*

THOUGH carrots are recognised as one of the best crops for feeding stock, especially in winter, the area grown in New Zealand is only between 1000 and 1200 acres, principally in the coastal areas of Wellington and Taranaki. The reasons for this are that carrots grow really well on only a limited range of soil types, and the labour required to control weeds is considerable. However, recently-introduced chemical methods of weed control show great promise and should result in considerably reducing the work required in producing a good crop, and farmers on suitable land would be well advised to consider growing an area for winter feed for cattle, sheep, and pigs.

CARROTS require a deep, light, fertile soil, the black or brown sandy loams of Taranaki being ideal. Heavy, poorly-drained, or stony soils are not suitable and produce only stunted, badly-shaped roots. A mild climate with a well-distributed rainfall is ideal, the crop requiring ample moisture throughout the growing period, as well as warmth and sunshine for the later stages of growth.

Place in Rotation

Carrots are usually grown in land ploughed straight out of grass, though they sometimes follow other crops such as swedes or mangolds. Very often a piece of land is used for successive crops for a number of years, but it is better to use a fresh area each year. The important points in selecting land are to get an area that will work up well, and one that will be relatively free from weeds. For this latter reason growing straight after grass is probably the best.

Varieties

Carrots vary considerably in colour, size, shape, and habit of growth. They may be classified according to colour, which varies from white to deep yellow, but usually those showing the same habit of growth are classified together.

(a) Long Varieties

1. Yellow-fleshed: Only two long yellow-fleshed varieties are extensively grown, and the most popular of these is Holmes' Improved. It is a big carrot with a circular crown about 4in. in diameter and tapers evenly to the tip. The average length of a good specimen is about 12in. There is usually about 3 or 4in. growing above ground, and harvesting is relatively easy. The flesh is a medium yellow. It is a very good cropper.

This variety was developed in North Taranaki. About 40 years ago Mr. Holmes, of Bell Block, New Plymouth, obtained some carrot seed from England. The resulting crop of long and very thin carrots was unsatisfactory. Mr. Holmes then crossed these carrots with another local variety known as Barriball, a square-necked, intermediate type, and selected from resulting hybrids the carrot which he called Holmes' Improved. The type has been maintained until the present day, and is very popular in Taranaki.

Yellow Belgian is a carrot which has been used to a limited extent in the last year or two but does not appear to equal Holmes' Improved either for yield or ease of harvesting.

2. White-fleshed: Varieties commonly used are White Belgian, Matchless White, and Matchless White Belgian.

White Belgian is generally smaller in the crown than Holmes' Improved, the sides taper less quickly, and the carrot is more blunt ended. A good average specimen is 3in. across the crown and about 12in. long. About 3 or 4in. grows above ground, which facilitates harvesting, but unless the ground has been very well prepared, the roots are often badly shaped and are liable to break when pulled.

Matchless White is wider in the crown and tapers to a finer tip than White Belgian, but has the disadvantage that it does not grow out of the ground much, and harvesting is difficult. Matchless White is generally considered the heaviest cropper, but is suited only to free, deep soils and is rivalled in performance by Holmes' Improved.

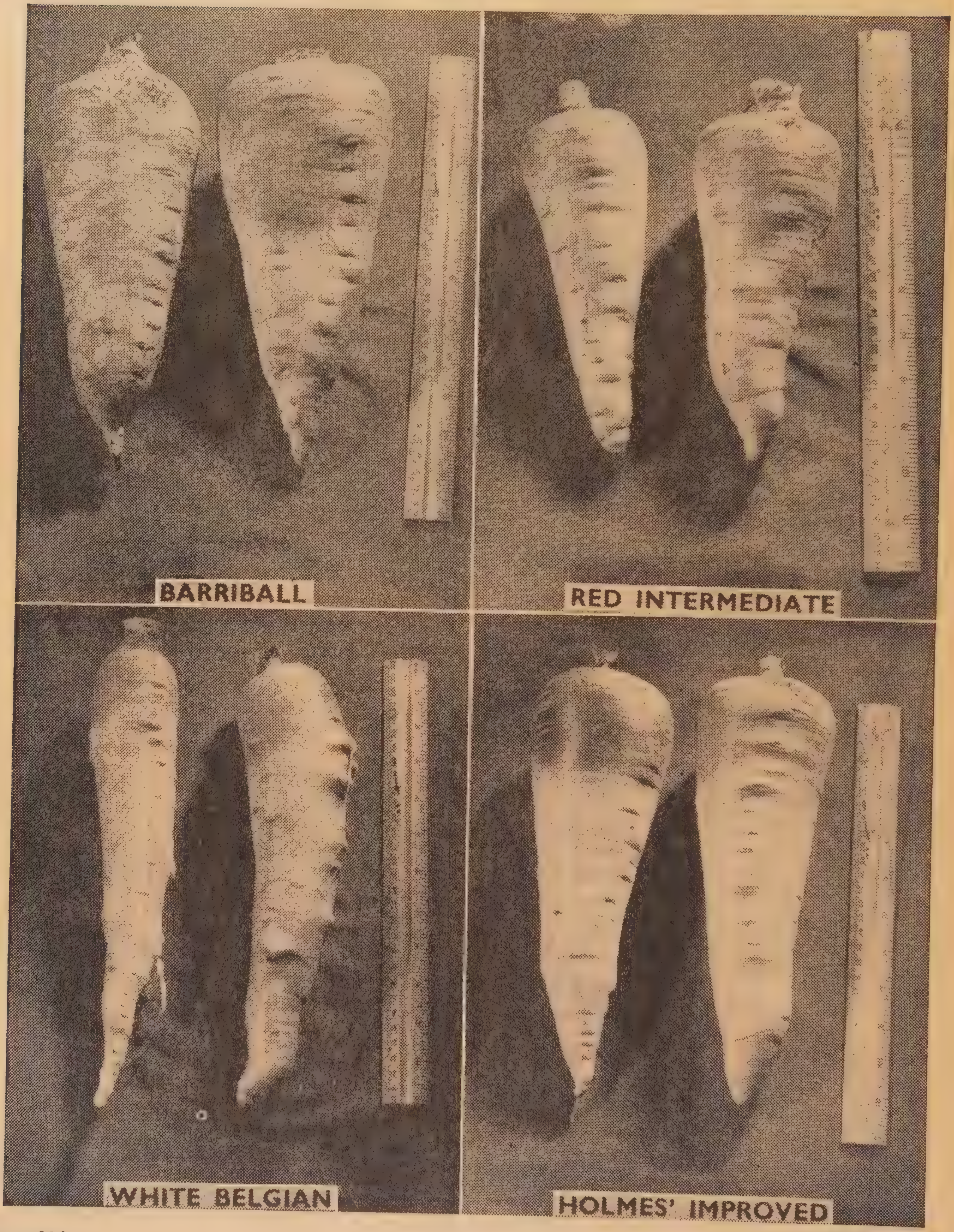
Matchless White Belgian was developed as a cross between the two varieties mentioned above to get a carrot growing out of the ground and having some of the yielding qualities of Matchless White.

(b) Intermediate Varieties

Intermediate varieties have a wide circular crown tapering evenly to a tip and are generally 3 or 4in. shorter than the long varieties. They are all yellow-fleshed. In shallower soils the intermediate varieties are probably the most suitable.

Red Intermediate, Scarlet Intermediate, Barriball, and Sinclair's

CARROT VARIETIES FOR FEEDING STOCK



BARRIBALL

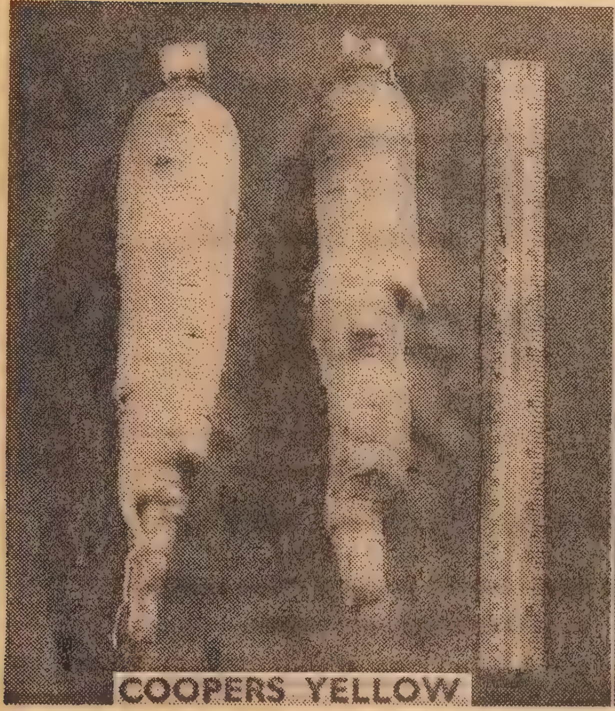
RED INTERMEDIATE

WHITE BELGIAN

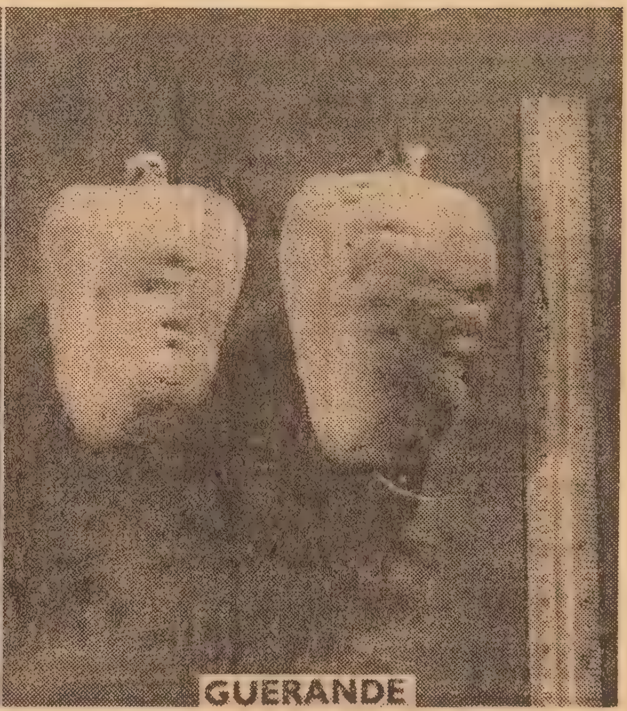
HOLMES' IMPROVED

[Photo News Ltd.

CARROT VARIETIES FOR FEEDING STOCK



COOPERS YELLOW



GUERANDE

[Photo News Ltd.

Champion are the most common of the intermediate varieties.

Red Intermediate has deep yellow flesh and is a good carrot for shallower soils. It is difficult to harvest, however, as it does not grow far out of the ground. Scarlet Intermediate is very similar but has a deeper-coloured flesh.

Barriball is another carrot developed in North Taranaki. It has a very wide crown, and is more or less square shouldered, tapering quickly to a point. The flesh is light yellow. Yields are quite good. Sinclair's Champion is a selection of Barriball and is similar in all respects. Neither of these varieties is commonly grown now.

(c) Short Varieties

Guerande or Oxheart is the only short variety of any importance. These carrots have a wide crown with very little taper. Their length is hardly more than their widest diameter. On shallow soils and for sheep feeding Guerande is the most popular variety. It has the advantage that the plants do not require thinning and are easily harvested. The crop can be fed off by sheep, and after they have eaten the roots down to the ground a stroke with the harrows will bring up the shells for cleaning up by the sheep.

In parts of the South Island carrots are used in considerable quantities as bait for poisoning rabbits. A short or intermediate variety is the most suitable, and Guerande or a table variety called Chantenay is widely favoured. Any surplus is disposed of for table use.

Preparation of Seed-bed

Land for carrots should be thoroughly prepared to destroy as many weeds as possible and to obtain a fine seed-bed. For sowing after grass the first ploughing should be at least two months before sowing, and the land should be disced and harrowed until the desired tilth is obtained. After the final discing and harrowing the ground should be rolled before sowing the seed.

Treatment of Seed

Carrot seed is light and inclined to be hairy and is liable to stick together when being sown. This can be overcome by mixing about an equal quantity of sand with the seed. If the sand is moist and is mixed with the seed 5 or 6 days before sowing, germination of the seed is hastened and the young plants get a better start.

Manurial Treatment

Carrots respond well to liberal manuring. Well-rotted silage or stock manure is good, but if this is not used, a mixture of superphosphate and blood and bone or bonedust (2:1) and 1 part of sulphate of potash applied at the rate of 4 to 6cwt. per acre when the seed is sown gives very good results. At present, with fertilisers in short supply, a mixture of 2cwt. of superphosphate and ½cwt. of sulphate of potash is satisfactory.

Sowing the Seed

The seed may be sown in ridges or on the flat. The width between the rows varies, according to conditions, from 14in. to 28in. In some districts where ridging is preferred up to 2lb. of seed an acre is sown 21in. to 28in. apart. In Taranaki the general procedure is to sow 1 to 1½lb. of seed on the flat in 14in. rows.

Sowing should be done in October or early November when soil and weather conditions are suitable.

On few farms is the area of carrots grown greater than 1 acre, and sowing is best done on the flat with a mechanical planter hand drill, but if a large area is sown a combined ridger and sower or an ordinary grain drill is used, the seed being mixed with the manure.

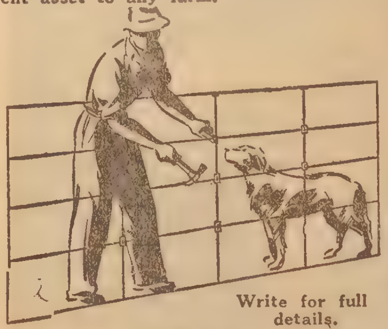
Subsequent Cultivation

The most important stage in the life of the carrot is the first few weeks after germination. If careful attention is given at this stage and weeds are controlled until the plants become well established, a good crop can be relied upon, but if weeds are allowed to smother the young carrots, the crop will almost certainly be a poor one.

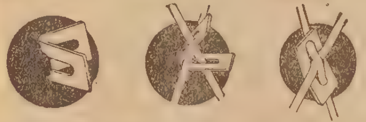
Intercultivation with a push-hoe or horse hoe should be begun as soon as

FULCRUM FENCE CLIPS

—FOR ECONOMY AND LONG LIFE. The Fulcrum Patent Clip utilises odd lengths of wire to form a sturdy, non-sagging fence . . . a neat and permanent asset to any farm.



Write for full details.



Each clip makes a non-slip lock, the only tools needed being a hammer and weight.

SHEETMETALS LTD.
Box 57, NEWMARKET, AUCKLAND.

USE
SHELL
MOTOR
OIL

You can be sure of SHELL

THE SHELL COMPANY OF NEW ZEALAND LIMITED
(INCORPORATED IN ENGLAND)

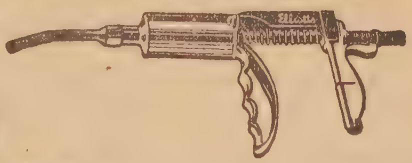
FOR EFFICIENT **WORM CONTROL**

Pin Your Faith To Proved **Phenzeen**

PHENOTHIAZINE DRENCH

Ton after ton of Phenzeen has been used on New Zealand farms—and more farmers every year are proving that Phenzeen drenching pays . . . especially for stud animals, for the poor doers and the tail of the flock. It's a phenothiazine drench and that means it kills more parasites per dose, with greater safety, and for a greater variety of animals, than any other known type of drench. Order Phenzeen now from your local Phenzeen agent.

and for accurate dosing



use an ELLIOTTS DRENCHING PISTOL

It makes possible accurate, even dosage and a dose range from 5 c.c. to 1 fluid oz. Can be supplied in either "safety-flow" nozzle for ordinary sheep drenching, or with Phenzeen (Phenothiazine) nozzle £1/19/6

If in doubt, write to

PREMIER
PRODUCTS LTD.
Huddart Parker Buildings, Wellington,
for name of your local agent.

the young seedlings can be distinguished in the rows, care being taken to avoid covering up the young plants. The work should be repeated as often as possible until the carrots are well established.

Weed Control with Kerosene

The area sown in carrots has decreased in recent years because shortage of labour on farms has been very acute and the average farmer could not afford to spend time on the crop. The use of power kerosene for controlling weeds in carrots has been tried extensively in New Zealand recently and results have been very promising. The main points in an article describing the method and results from the Department of Agriculture's vegetable production areas which appeared in the February, 1945, issue of the "Journal" are as follows:—

APPLICATION

"Application can be made at stages of growth from seedling leaves 1in. high up to the early true or 'fern' leaf stage. Most successful results have followed kerosene spraying when seedling carrots have formed two 'fern' leaves. The effect of kerosene sprayed along the rows at this stage is quite spectacular. After 24 to 48 hours most typical weed growth is completely killed, leaving seedling carrots unharmed and weed-free. There is no need to spray the whole area. More economical practice is to spray the carrot rows in an 8in. to 10in. band, leaving a centre strip between the rows untouched until intercultivation equipment can be used to rid the area completely.

"Power kerosene is variable in its content of certain chemical ingredients, especially different bulk importations. There is a chance that any particular line may possess properties making it at least slightly injurious to carrots. It is advisable, therefore, to test each drum of kerosene by spraying a short strip of the crop. If results appear satisfactory after 48 hours, the grower can proceed with confidence over the whole area. Among other conclusions reached by Departmental officers in using kerosene as a carrot spray are:—

"1. A higher and speedier death rate follows treatment of young weeds compared with mature weed growth.

"2. If weed growth is excessive in density or mature in condition, the spray should contact stems as well as leaves.

"3. If spraying has been effective, good results should be apparent after 24 hours. **It is not advisable to spray the same crop twice.**

"4. Ideal conditions for a 'kill' are provided by calm, dry weather. If rain follows within three hours of spraying, results are unlikely to be good.

"It has been found that hand-operated knapsack type sprayers give better control of weeds with greater economy of materials used than any other type. The aim must be to direct a cone of kerosene along the row in an 8 to 10in. band. At a walking pace knapsnack sprayers can be adjusted to apply from 25 to 35 gallons of kerosene per acre, within which range excellent weed control has been obtained. These dosages relate to band-row applications, not to complete coverage of any area.

COSTS

"As an indication of the value of the treatment, apart from its certain success in weed destruction, it has been recorded that in a 21in. row-spaced crop three men sprayed 4½ acres of carrots in 6 hours using 32 gallons of kerosene an acre. The total cost of labour and material was about £3/6/8 per acre. A comparable three acres were hand weeded occupying 260 female working hours at a cost of £7/10/0 an acre.

"The hand-weeded area later required a second weeding, while the sprayed area was clean. **It is thought that four man hours per acre will suffice for the applications on most areas."**

During the past season (1945-46) the writer sprayed areas on four farms in North Taranaki, and the following conclusions are drawn from the trials:—

1. The spraying should be done as early as possible after the carrots reach the "fern" leaf stage, and preferably when they are about 1in. to 1½in. high. If left too late, the leaves spread out and prevent the spray reaching weeds growing in or right alongside the rows. These are the most important ones to kill.

2. A good knapsack sprayer which will deliver a fine, even application 6in. to 8in. wide is necessary. The width of the application can of course be controlled by altering the height the nozzle is held above the ground.

3. Under normal conditions in a district like Taranaki it is difficult to strike ideal conditions for spraying—fine weather for a day or two after spraying—and where rain fell on the evening of the day spraying was carried out or next morning results were not as good as where fine, warm weather followed for two days. Therefore, if possible, spraying should be done when a few fine days are anticipated.

4. Most weeds common in the carrot crop, such as docks, ribgrass, and twin cress, were killed completely when well sprayed, and all four farmers whose crops were treated agreed that the treatment was worthwhile and gave the crop a chance to become well established. Also the time and work saved at a time when harvesting occupies all the available labour on the farm is an important factor.

It will be seen that this method of weed control is relatively cheap and very effective, and the reduction in time spent in weeding and in costs makes the growing of the crop a good proposition even on the small one-man farm.

Thinning

Thinning should be done as soon as the plants are strong enough to stand alone. The distance between plants should be about 4in. to 6in. The most robust plants should be left and should be disturbed as little as possible. Thinning may be done with a hand hoe, but hand thinning is better, as hoeing is liable to bruise and damage the young plants. Many farmers do not thin at all, but this generally results in small, badly-shaped roots and a lighter crop. The Guerande variety does not need to be thinned.

Harvesting and Storing

Carrots take 6 to 8 months to reach full maturity. They can be harvested as a rule from May until July or August, and they have the advantage that they can be left in the soil until required to be fed. It is safe to feed carrots at any time provided they are sound. Sometimes they are pulled and stored in a clamp or heap, but this is not the usual practice.

Feeding Value and Utilisation

Carrots are a very nutritious food for all classes of stock, and the following is an average composition:—

	per cent.		per cent.
Water	87.0	Soluble carbohydrate	9.3
Protein	1.2	Fibre	1.4
Oil	0.2	Ash	0.9

The ration of carrots fed to dairy cows varies considerably according to amounts of other feed available. Though up to 35lb. per cow per day can be fed with safety, carrots are generally used in much smaller amounts of 10 to 15lb. per cow per day, and such a ration provides a very useful supplement for cows near to calving or after calving until spring feed comes away. If the carrots are chaffed and fed in boxes in the milking shed, each cow gets an equal share and the feed is in better condition for the cows to eat.

Sheep are normally folded on the crop and about 10lb. a day is sufficient to satisfy their requirements. When used as a dietetic for horses, 7 to 10lb. a day is ample, fed with good

THE CARROT CROP . . .

oaten chaff. Carrots are an excellent food for fattening store pigs and they require about 10 to 15lb. per pig per day, together with some protein-rich food such as meat meal, pea meal, etc. Thus 1 ton would provide 3 months' feeding for 2 store pigs.

Yield

Yields up to 70 tons per acre have been obtained in Taranaki under good conditions and where the crops have been well looked after, but generally a yield of 40 tons per acre is considered good, and the average is about 35 tons.

Sowing Home-grown Seed

Good seed is essential for growing a good crop, and many farmers who grow carrots regularly save their own seed, which they consider is more satisfactory than bought seed. To do this successfully requires careful selection. The following extract from an article on selection of seed for root crops published in the Imperial Agricultural Bureau Journal for July, 1943, stresses this point.

> Carrot is a cross-pollinated crop and isolation between varieties is necessary as well as isolation from wild carrot. While the distance maintained between varieties is sometimes not more than a few hundred yards, isolation of at least one mile has been recommended for the growing of stock seed.

The following is the best procedure:—

From the mature crop carefully select carrots which conform in size, shape, and colour to the ideal for the variety. Any badly-shaped roots or any in which the crown is sunken or uneven should be discarded for seed purposes, as such roots are more likely to develop soft rot in wet weather. The selected roots should be carefully stored, and in September or October should be planted in a well-prepared seed-bed protected as much as possible from areas where other carrots are growing. The roots should be planted 12in. apart. The seed heads are cut off as they ripen and should be stored in a cool dry place until fit for threshing. Yields of seed from 600 to 800lb. per acre have been obtained in a seed area.

◆

MAIZE GROWING FOR GRAIN

Bulletin No. 269, "Maize Growing for Grain," dealing with the sowing, cultivation, and harvesting of the maize crop, is now available free from your nearest office of the Department of Agriculture.

WINTER PIG FEED CROPS

"TO assist in the drive for more pig meats, which are urgently needed, the Government has decided to continue the Crop Subsidy Scheme of £5 per acre for winter pig feed for next winter, and to consider an increase in the price schedule for pigs," states the Minister of Agriculture, the Hon. B. Roberts.

"AGAIN this year over 5,000 farmers have taken advantage of the scheme, and it is expected that more than £125,000 will be received by farmers growing crops for pigs. I would like to stress, however, the need for more grain crops, and wherever possible farmers should increase their acreage of cereal grain for pig feed. The terms and conditions of the Crop Subsidy Scheme will be the same as during the past two seasons, and full details are available from the nearest office of the Department of Agriculture or the local District Pig Council.

"Slaughtering returns show production of pig meats to have fallen considerably over the past four years, though no effort has been spared to encourage production, prices were never better, and progressive increases in the schedule have been made in the past three years. The weight range for bacon pigs has been raised to 200lb., imported stock feeds, when available, have been subsidised to keep prices to pig producers at an economic level, an increased winter price schedule has been introduced, and last but not least of these advantages is the £5 per acre Crop Subsidy Scheme introduced by the Government to ensure adequate winter feed supplies for pigs.

"Nevertheless, pig killings have fallen off each year since 1941 and are continuing to do so. Total killings in all export and rural slaughterhouses, abattoirs, and on farms were 1,102,000 carcasses in 1941, and there have been progressive reductions to 881,000 in 1942, 755,000 in 1943, 705,000 in 1944, and 684,000 for the year ended December, 1945. Slaughterings in 1945 thus show a reduction of 418,000 compared with 1941 killings.

"This reduction in numbers does not, of course, tell the whole story. The increase in the numbers of heavy-weight pigs for bacon during the war helped to maintain pig meats on a tonnage basis, so that while numbers decreased alarmingly, the weight of pig meat, which reached 52,000 tons in 1941, fell to only 42,000 tons in 1945.

"There is little doubt that some of the falling off in production is because of the reduction in cows milked, which is due mainly to a decrease in the amount of labour available, and to lack of winter feed supplies.

"To achieve the 1946-47 programme of increased production of pig meat, killings will have to increase by 200,000 pigs. This can be accomplished with the present breeding stock by increasing the annual production of pigs per sow from 8.8 as at present to 10.5, the 1945 level.

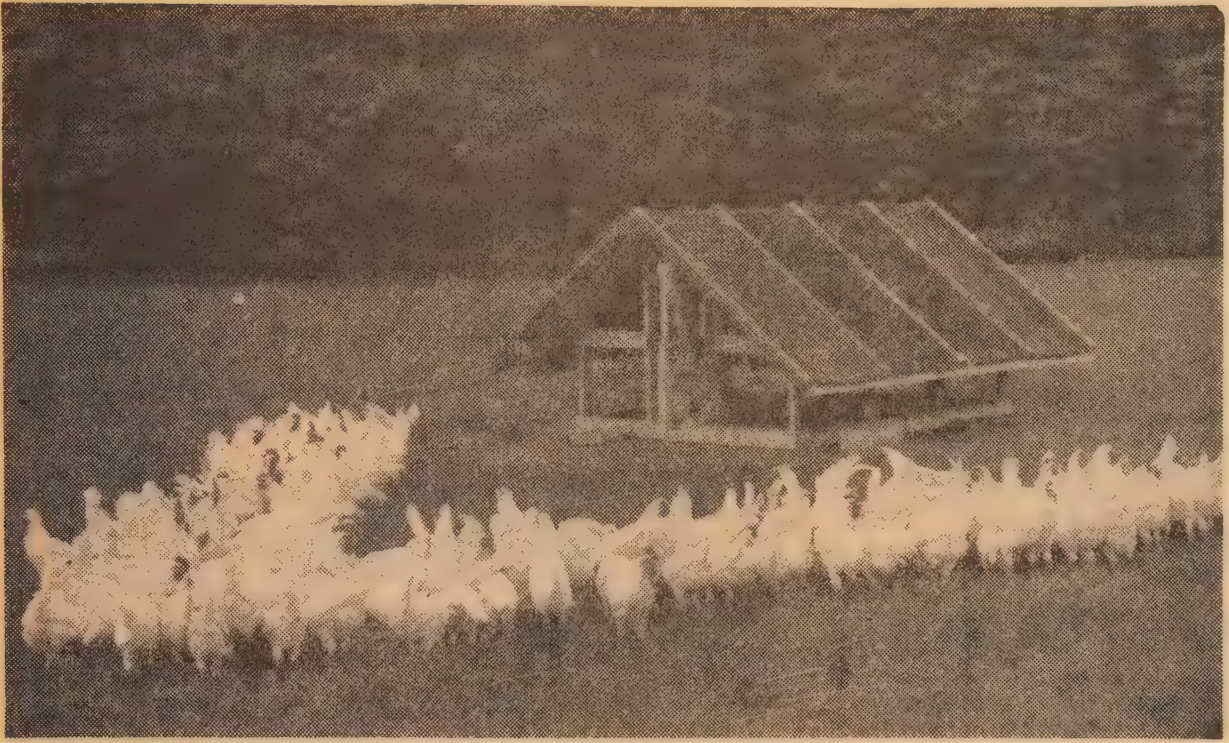
"The basis of increased pig production lies in the wintering of a greater number of pigs, and this involves the provision of a feed supply for the maintenance of pigs when supplies of dairy by-products are not available, which is appreciated by most pig keepers.

"Increased production can come only by having sufficient pigs on hand to utilise to the full supplies of milk as they become available. Because of our inability to obtain stock feeds from overseas, this extra feed must consist of home-grown crops, which is a very good reason for the introduction of the Crop Subsidy Scheme.

"The £5 per acre subsidy for winter pig feed has been accorded a very mixed reception. Many producers thought that it would have been better to have given encouragement by the more direct action of a rise in the price schedule. The Government policy in the price of pig meats has been governed generally by stabilisation regulations, and if the price schedule had been raised, there still could have been no improvement in the stock feed position, and producers could not have taken advantage of any increase in prices when stock feeds for winter feeding were unobtainable.

"The Crop Subsidy Scheme was both a means of increasing the much-needed home-grown supplies of stock feeds and an indirect subsidy on production. The scheme is virtually a bonus of 10/- per pig carried through the winter.

"Since it is unlikely that there will be any importation of stock feeds for some time, the provision of home-grown crops is the only course open, and there is no doubt that more pigs have to be wintered if production is to be increased. Although pig producers have already made a wonderful effort in providing the requirements of the Allied Armed Forces in the Pacific during the war, the need is just as pressing now."



Management of Growing Poultry Stock

By F. C. BOBBY, *Superintendent of Poultry Husbandry, Wellington.*

THERE are indications that the number of pullets being hatched and reared this season is below that for last year, because of the shortage of food suitable for poultry. This must result in a reduction in the number of eggs produced in the Dominion next winter, and it is of the greatest importance that maximum attention should be given to the 1946 pullets during the growing stage. Wastage among these birds must be reduced to a minimum and strong constitutions built up to withstand the strain of heavy egg production which will be so urgently needed by both poultry producers and the consuming public next year.

THE majority of poultry farmers will have flocks of pullets and cockerels in the growing stage by this time. After weeks of concentrated work and attention upon chickens during the six weeks' brooding period some relaxation may be permissible, but the experienced poultry farmer knows too well how much damage can be done during the growing period by carelessness or lack of adequate attention. Much of the good work done during the brooding period can be nullified at this later stage.

While the management of growing birds is comparatively simple, it is well at this season of the year to review the practical points which collectively influence to a marked degree the class of pullet available for the laying houses at the end of the summer.

Few experienced poultry farmers would deny that free range over clean grass is the ideal condition for growing stock, and increasing numbers of poultry farmers are endeavouring to give their growing birds these conditions. Free range supplies exercise, sunshine, and a selection of green herbage and natural insect food, all of which assist in building up constitution in birds bred from good parents. These conditions result in good frames, tight plumage, proper pigmentation, and bright eyes, which are indications of health and stamina.

Growing birds should be run on clean grassland and not on ground that has recently carried adult or fully-grown birds. Where free range or enclosed runs have previously carried laying pullets or hens there is always a risk that these birds may have infected the ground with internal parasites, such as worms, or some poultry disease. It is highly undesirable that young growing stock should be laid open at this stage to these infections. A range should be kept solely for growing stock and rested in between seasons.

Growing birds require maximum fresh air without draught or dampness, and in such conditions even the coldest weather will not harm them. They do not require coddling; on the contrary, the development of a hardy constitution should be encouraged. For this reason the summer colony house illustrated, plans of which may be obtained from any Poultry Instructor or from the Department of Agriculture, P.O. Box 3004, Wellington, is strongly recommended. Each colony house will carry 60 well-grown pullets or up to 40 cockerels. It is an ideal type of house for use on free range.

NEW LAMPS
for OLD . . .

and a NEW NAME
for an OLD FIRM

This is to advise our many customers of the change of name from A. M. DOULL & CO., to

★ ALAN DOULL LIMITED, ★

by which latter name we will be known in future.

Our usual services, price lists, quotations, will remain unaltered. All we have changed is our name, not our personality or our beliefs in sincere, honest service, and the selling of good quality products.

We have available for immediate delivery:

RICE BRAN, COPRA MEAL, LINSEED MEAL, GROUND OATS, BARLEYMEAL, PEAMEAL, STANDARD POULTRY MASH, WHEAT, MEATMEAL, POTATOES, ONIONS AND SEED POTATOES OF ALL KINDS.

Write for Price Lists. Daily deliveries to Rail and Boat.

ALAN DOULL LTD.

60 Hobson Street, AUCKLAND.

P.O. Box 1778 : Phones: 49-912 & 41-735

Subscriptions to the "Journal of Agriculture" (2/6 a year) may be paid at any office of the Department of Agriculture or to the Publisher, Box 3004, Wellington.

TERRAZZO SINK BENCHES

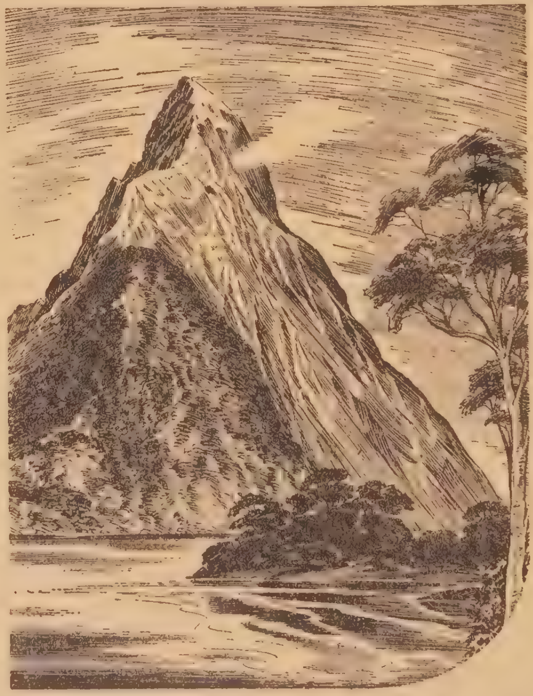
MODERNISE YOUR KITCHEN WITH A HUME TERRAZZO SINK BENCH. Manufactured in Attractive Designs and a Variety of Colours. Write for Measurement Chart and particulars.

TERRAZZO SUPPLIED FROM AUCKLAND WORKS ONLY.

Also Manufacturers of BOILER FRAMES, WASHTUBS, SEPTIC TANKS, CHIMNEYS, WATER TROUGHS, STORAGE TANKS, Etc.

HUME PIPE COMPANY (AUST.) LTD.
Inc. in Aust.
BOX 1734 5th FLOOR, DILWORTH BLDG. AUCK.
BOX 287 YORK HOUSE, WELLINGTON
RAVENSBOURNE, DUNEDIN
BOX 5 HORNBY, CHRISTCHURCH

Box 1734 - Fifth Floor, Dilworth Bldg., Auckland.



MITRE PEAK

For
FIRM
FOUNDATIONS
of prudent
Estate
management

Appoint

The PUBLIC TRUSTEE

A.2.10

A stuffy atmosphere or lack of ventilation during the night saps the vitality of growing birds and renders them susceptible to colds. The atmosphere inside a house of growing stock should be tested first thing in the morning before the birds come out; if the air is unpleasant, stagnant, and full of humidity, the birds' health will be suffering and they will never make first-class laying pullets or sound stud cockerels.

Shade in Hot Weather

During a spell of hot, dry weather growing birds should have access to the shade of trees, shrubs, or the bottom of a well-grown hedge. Unless shade is available, birds tend to stay in their houses; this may be satisfactory if the housing is of the open type like the colony house illustrated, but can be detrimental where the house becomes hot and lacks fresh air.

Birds drink quantities of water during hot weather, and it is harmful to stock to allow the water supply to run dry during the heat of the day, even though it may be fully replenished later. If water is lacking in hot weather, food consumption will be lessened and the rate of growth reduced. Young birds allowed to get thirsty in hot weather will gorge themselves with water when they eventually have access to it, to the detriment of their health.

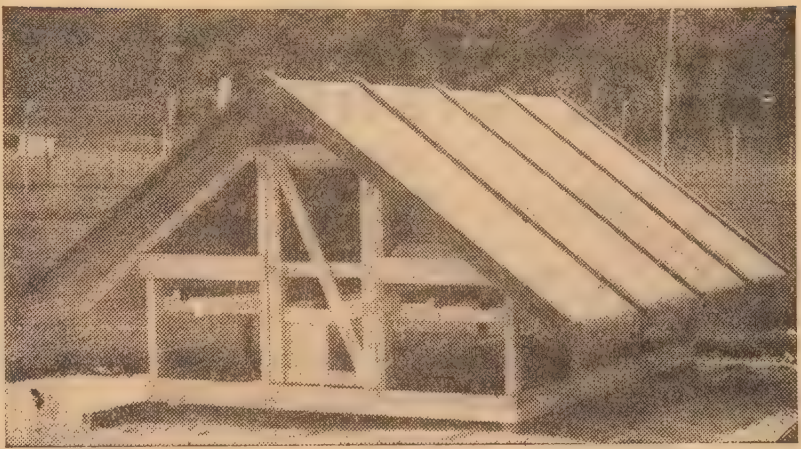
Green Food on Free Range

Experience indicates that it is advisable to feed green food on range. Early in the season young and nutritious grass is available and will be eaten—especially by birds fed with wet mash and less readily by uncontrolled dry mash fed stock. As the season advances the grass loses much of its feeding value and palatability. Additional green food then becomes an essential part of the bird's diet The shortage or complete lack of green food during the drought in the Auckland Province last rearing season resulted in a deficiency of vitamin A which caused nutritional roup even among birds running free on grassland.

Overcrowding

No form of mismanagement causes more damage to growing birds than overcrowding, either in the housing accommodation allowed or in the amount of ground given for an outside run. This is an obvious mistake which should be easily avoided, but which can quite easily be made by the experienced poultry farmer.

The estimated capacity of a colony house is, say, 50 birds four months old. The same house will obviously hold a greater number of two-month-old birds without detriment to the stock. A producer accordingly puts 80 two-month-old pullets into the house, but forgets to reduce the number as they grow or delays until they are, say, three and a half months old. These birds become overcrowded and in two weeks serious damage may have been done.



The summer colony house recommended by the Department of Agriculture for growing stock.

Forgetfulness, pressure of work, or lack of observation all lead to this mistake, and birds lose vitality, slow down in growth, or may contract some disease. As the result promising young pullets become second-rate stock or even a menace to other healthy birds.

Culling

Effective culling during the growing period is dependent upon powers of observation, patience, and persistence. The poultryman looking after young birds on range must have a keen sense of observation, as the birds are spread over a wide area and are often not easy to observe closely. Patience is required, as it is often no easy matter to run down a cull bird; it takes up precious time in a busy day. Persistence is necessary, since culling should be continuous. For all its difficulties, culling is worth while, since it saves money. The bird which it is obvious will never become an economic producer still eats food, takes labour, and occupies housing space—all to no purpose financially. The weakling or the ailing bird may be carrying disease or the vitality-sapping cold. Unless they are removed promptly, such birds, even though few in number, are likely to start an outbreak of trouble among the healthy stock and taint the ground they run over.

Consistent culling is as important as good housing, good breeding, and good general management, but unfortunately on many farms it receives considerably less attention than other aspects of good husbandry. Producers may think that this neglect is inconsequential, but in the majority of cases it costs money—sometimes a lot of money when disease which first started among a few neglected culls causes heavy casualties.

Combating Red Mite and Lice

Poultry producers should always be on their guard against minor troubles such as red mite and lice infestations. Red mites can become troublesome, and a look-out for this parasite should be constantly maintained. They will not be seen on the birds, which they attack only at night. During the day they may be found under perches, where they rest on bearers, in cracks in timber, under hard dry droppings, and in other sheltered places. They are red and full of blood. A mixture of one-third kerosene and two-thirds creosote applied at the points where these mites accumulate will soon destroy them. Old sump oil from a car is similarly effective.

Lice may be found on birds, particularly on the abdomen and round the vent. They become increasingly troublesome as the weather becomes warm and the birds develop. These pests may be destroyed by applying a thin coating of nicotine sulphate on the perches just before the birds roost. The action of the body heat of the birds on the nicotine sulphate causes fumes to be released and permeate through the feathers, killing the lice.

Infestations of either mites or lice reduce the vitality of the birds and in bad cases will cause stunted growth. Careful observation and early action will remove any chance of these troubles assuming major proportions.

By closing 30% to 40% of your pastures for HAY & SILAGE now . . .

we can maintain BUTTERFAT PRODUCTION and help Britain

Reserve feed is essential if we are to maintain our butterfat production during the winter months. By planning stacks and stacks of hay, and ample silage NOW we will be in a position to keep our herds fully productive when normal feed is in short supply. By following these recommendations every dairy farmer can help in the fight for GREATER BUTTERFAT PRODUCTION.

1. Close paddocks as early as possible.
2. Cut paddocks early in the summer as this gives fresh and valuable growth for later feeding.
3. Cut at flowering stage when the greatest weight of nutritious material will be obtained.
4. Protect hay stacks or baled hay from the weather —because this harvest is a VITAL harvest.

Our butterfat objective this season is one hundred and ninety thousand tons. We CAN do it, but we must plan now to keep supplies of butterfat flowing to the factories next winter. By following this four-point plan for increased production we have a chance of bettering this total—making still more butter available to Britain who needs all we have pledged . . . the utmost we can produce.

1. RATION new growth by "on-and-off" grazing until ample grass is available and be sure to provide the best of your fresh spring paddocks for your milkers.
2. FEED hay and silage until the cows refuse to eat it any longer.
3. PLAN your hay and silage areas for next harvest—but harrow the selected paddocks prior to closing.
4. REAR additional heifer calves from good cows this coming season—and so build up your herd with good stock.

FOOD PRODUCTION IS OUR JOB

FIGHT FAMINE

Prepared by the Department of Agriculture for the Famine Emergency Committee

FARM WORK FOR NOVEMBER

By the Fields Division

PASTURES

Secondary Burns.—During the coming month the scrub should be cut on all areas of secondary growth intended for grassing next autumn, to give ample time for the material to dry out. If scrub is cut too early, the leaves drop off and the result is a poor fire; but if it is cut about this time of the year, the material dries out properly, most of the leaves are retained, and a fierce fire is secured. Too many farmers cut the secondary growth in the winter when more time is available. By autumn the scrub has lost its leaves and invariably the burn is poor.

Cut the secondary growth as close to the ground as possible. That applies to all growth, including manuka and gorse. The chance of regeneration is less if the scrub is cut very close to the ground.

Pasture Control.—At this time of the year the quality of the feed deteriorates on dairy pastures and on pastures devoted to raising fat lambs. That is caused by the ryegrass beginning to form seed heads; the plant then has less nutritive value. Its feed value can be improved by inducing it to produce leaf instead of seed heads by use of the mowing machine. The pasture should be topped lightly with the machine at this time of the year. It will be found that dairy stock or other cattle will clean up the cut material if they are turned into the field a short time after the cutting.

Irrigation.—A close watch should be kept on pastures at this time of the year for any signs of drying out. As soon as these signs appear the pastures should be irrigated. Only sufficient water should be employed to flood the field completely. The use of too much water is not only wasteful but also may create drainage problems.

Small Seed Crops.—Fields of ryegrass intended for seed should be closed up during this month. In wet seasons they should be closed up later than normally, and in dry seasons earlier.

Autumn-sown Pasture.—All land for sowing to grass during the autumn will be ploughed by now and should receive top working with discs, cultivators, and harrows to work it down to a fine seed-bed before dry weather makes such work difficult.

Topdressing.—Fields which have been cut for silage can be topdressed at this time of the year, which will considerably benefit summer and autumn production. This work, of course, depends on the availability of supplies, and most farmers will prefer to reserve their phosphate for application in the early autumn; it will then produce extra feed in the winter, which is usually required more than the extra feed in the summer and autumn.

SILAGE

Silage-making will be in full swing during November, followed by the harvesting of a few fields of hay toward the end of the month as the weather improves. Fields that contain a large quantity of paspalum should be shut up this month for harvesting in January. Before starting harvesting, see that the harvesting gear is in good order. Every year accidents are caused in the hay-harvesting field by neglect of this precaution.

Material for silage should be cut only in sufficient quantity for that day's or the next morning's harvesting operations. Attempts should be made to harvest speedily, especially when finishing the stack. As soon as the stack is completed some earth should be thrown on to the top and kept in bounds by wire netting, bags of earth, or other means so that sufficient weight is placed at the edges.

CEREAL GREENFEEDS

Maize should be sown this month at approximately 2 bushels an acre, and toward the end of the month millet should be sown at about 18lb. an acre. The millet will produce greenfeed from January onward and the maize from February onward. In Canterbury land for sowing greenfeed in January and February should be ploughed this month and immediately top worked before it dries out.

ROOT AND CRUCIFEROUS CROPS

Where required for weaning lambs rape sowings should continue throughout the month, and they may be continued until mid-December. Rape should germinate in three or four days after sowing if sufficient moisture is present. If it fails to germinate because of a crust forming or any other cause, harrow and resow. Soft turnips sown on dairy farms in November will provide feed during the dry period of February. In November swedes are commonly sown in Otago and Southland for next year's winter feed. In the North Island swede sowings frequently begin during November, and chou moellier is also sown in November for next year's winter feed.

Carrot sowings should be completed this month. Frequently on heavy soils the ground is not fit for the sowing of carrots until November. On areas sown with carrots last month attention should be paid to weed control. If power kerosene is to be used, its strength should be tested on a short length of a row before applying it to the whole of the area.

As soon as rows of mangolds, sugar beet, and carrots can be clearly seen they should be intercultivated. Keep ground in pumpkins and artichokes intercultivated and free of weeds. Sowings of pumpkins, mangolds, and sugar beet which were not completed last month should be completed this month.

POTATOES

Except on special areas, potato planting should be completed by now. Land where potatoes were planted last month should be harrowed to kill weed seeds before the potatoes come through the ground. As they emerge the potatoes should be harrowed, followed by intercultivation. The remains of last year's crop should be disposed of.

CEREALS, PEAS, AND LINEN FLAX

Harrow areas of early spring-sown crops, and peas in particular, to break soil crusts and destroy weed seedlings. Land in pasture intended for sowing to wheat next year should be skim ploughed or hustled during November so that the turf is completely rotted before deep ploughing next autumn. See that all cereal-harvesting machinery is in good order for the coming harvest.

Attempt to complete the sowing of maize for grain production this month. On heavy land it is frequently difficult to complete sowings until late November or even early December. Early-sown maize should be harrowed until the crop is about 1ft. high to kill weed seedlings. This is better done on a hot sunny day when the plants are limp.

Linen flax should be sown in October or November on a well-prepared, fine, firm seed-bed.

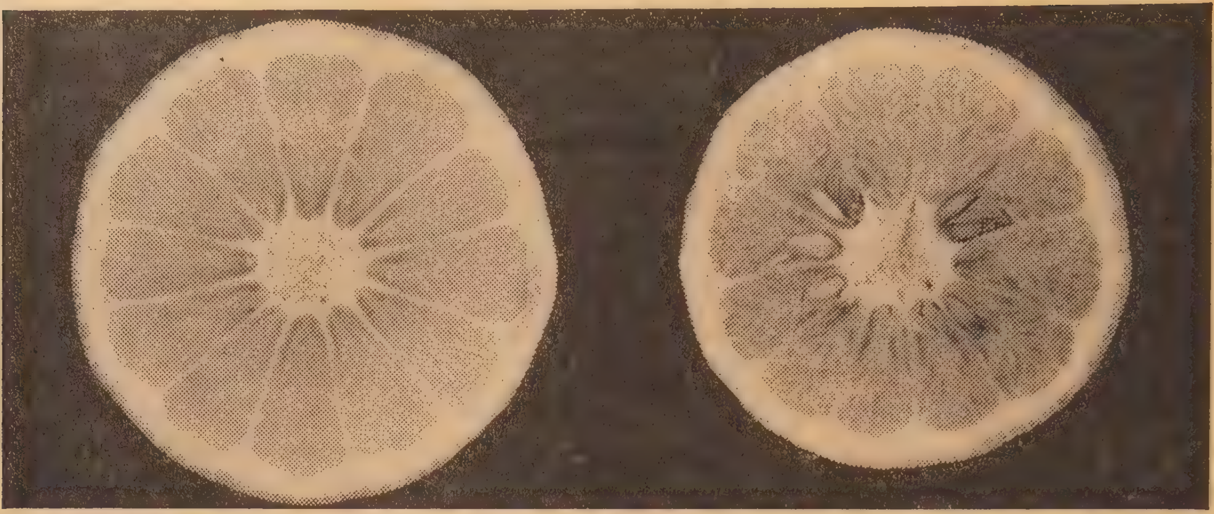
STOCK

On the lower country shearing should be completed during November. Two weeks after shearing the sheep, including lambs, should be dipped. In dipping rams extra care should be taken, particularly if they are in a high, mettlesome condition. They should be dipped one at a time, as they are frequently faulty swimmers, and a bridle should be provided for valuable stud rams. Do not dip hot, hungry, tired sheep. After dipping put them in a shady location.

GENERAL

Look over the water supply to see that it is in good condition for the coming dry weather. Inspect fire-fighting equipment and take precautions to prevent the spread of fires. Overhaul harvesting machinery. Cut blackberry and spray ragwort with sodium chlorate.

Improved Citrus Types May Come From "Sports"



Left—Good type Morrison's Seedless grapefruit. Right—Coarse-fleshed, seedy strains of this type should be avoided.

MOST citrus trees are prone to develop "sports" or "off-type" fruits which vary considerably from those borne on the parent tree. This variation is caused by what is known as "bud mutation." Many improved strains have originated in this manner rather than by hybridisation, and most of the unproductive and "off-type" trees found in citrus orchards are the direct result of unintentionally taking bud-wood from trees of bud-variation inferior types.

By J. E. HUME, *Orchard Instructor, Tauranga.*

CAREFUL watch should be maintained for improved types of "sports," and limbs or twigs carrying such fruit should be carefully and permanently marked for further observation. They should be kept under close observation in subsequent years, and if the same characteristics which first attracted attention are maintained, buds should be taken from the "sport" and worked on to a mature tree to discover whether the improvement is hereditary or the result of an environment or stock factor.

Many citrus groves have their "off-type" tree problems, which can become serious. However, they can and should be reduced to a minimum in future plantings by careful selection of the trees from which to propagate.

When checking trees for fruit quality the fruit should be selected from all parts of the tree, as that on one side may be superior to the balance. Bud-wood taken from such a tree as a whole would possibly produce a very mixed type of fruit when worked on other trees.

Orchardists propagating their own trees for replacements or extensions should make sure that the buds used are selected only from those trees carrying consistently heavy crops of superior quality fruit.

New Zealand Grapefruit

A good type Morrison's Seedless grapefruit is medium to large in size, a bright orange yellow colour with a thin rind, practically seedless, and full of juice. The flesh is comparatively free from rag and smooth in texture, with a sub-acid flavour when the fruits are mature, which is usually about the end of August. The tree is vigorous in growth, fairly rigid in habit, densely foliaged, and a good, consistent bearer.

Care of Nursery Stock

Young seedlings are very sensitive to climatic variations, and should be kept protected by a light covering until well established. When the covering is removed protection from wind is still necessary, and the use of sacking as a windbreak for the bed is advisable.

Yearling stock should be kept free from weeds. Stock-beds should be cultivated lightly, taking care that the stems and roots are not injured. In the immediate vicinity of the stock hand weeding is recommended in preference to the use of sharp tools. In very dry weather irrigation of the bed is advisable. To give the ground a good soaking and then cover it with some well-rotted mulch is better than to sprinkle the topsoil at frequent intervals.

With the object of developing a reasonably straight rod to a height of at least 12in., the lower side shoots should be removed as the stock grows up. Stocks in their second year should be treated similarly and preparations made for budding, which in some localities may be started in November; however, a better average result can be obtained by budding in February.

Young nursery stock is subject to defoliation by fungus diseases such as wither tip (*Glomerella cinqulata*) and brown rot (*Phytophthora citrophthora*). Bordeaux mixture (3-4-50) should be applied to keep the plants free from these fungi. The addition of a 1 per cent. white summer oil to this spray will also keep scale insects in check.

NEW ZEALAND-MADE PEA VINERS

THE pea viners mentioned in the article "Growing Peas for Canning in Nelson," by D. M. E. Merry, in the August issue of the "Journal" were stated to be of American manufacture. The machines were copied from American models but were built in Auckland. The basic design had to be altered to simplify fabrication and procure greater ruggedness, some dimensions had to be altered to use available sizes of materials, and many components had to be completely designed and made here. The efficiency of the machines is a tribute to the wartime service rendered to farmers by New Zealand industry.

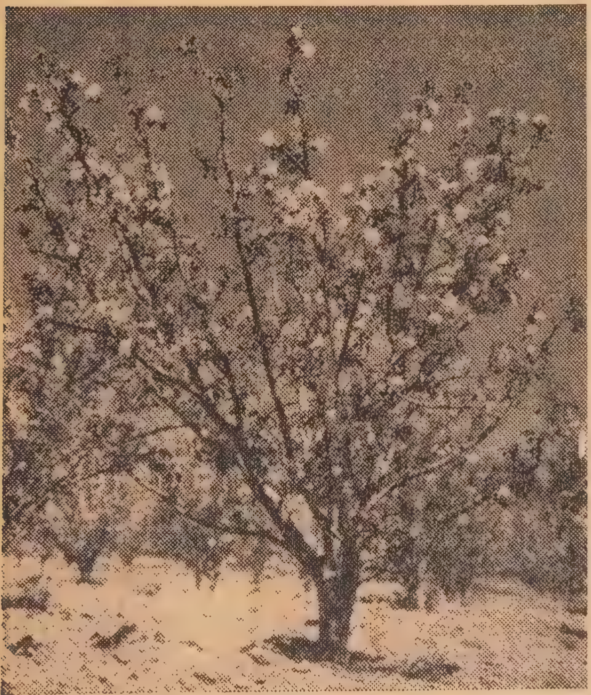
Bees' Part in Setting of Fruit

Damage from Untimely Arsenate Sprays

By the Horticulture Division.

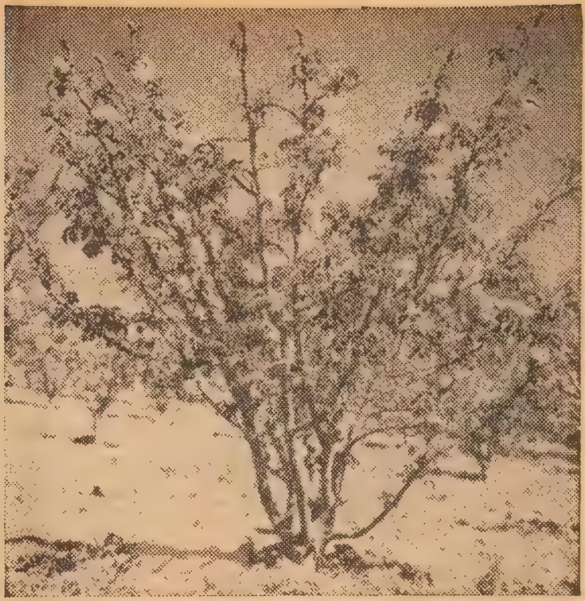
AN annual financial loss is suffered by growers of pip fruits in many parts of the Dominion through the depredations of codling moth (*Cydia pomonella*), which, besides rendering a proportion of the apple and pear crop unsaleable each season, also causes "sting" damage to a further portion so that it can be included only in the lower grades for which a correspondingly lower price is obtained.

Although it may not appear so, codling moth, which is recognised as a serious orchard pest, is one of the easiest to control, providing the main principles of spraying are adhered to, namely, the application of lead arsenate sprays properly mixed at the right dilution, and thoroughly applied at the correct times, commencing when almost all the blossom petals have fallen from the tree and continuing at intervals until danger of infection is past. Regular applications are essential, as the emergence of the moths from over-wintering larvae commences usually in late October in the warmer districts and varies according to climatic conditions and temperatures in other districts. After emerging the female moths begin egg laying, and the grubs hatch in late spring and through the summer.



[*Cawthron Institute photo.*

Fig. 1—A fruit tree in full blossom, when arsenate sprays have a negative effect in codling moth control and are dangerous to pollinating bees.



[*Cawthron Institute photo.*

Fig. 2—With the blossom period almost over arsenate sprays will give satisfactory control of codling moth with a minimum danger to the setting of the crop and without loss of bees.

Most varieties of apple and pear trees are in full bloom during October, but the period varies according to location and varieties.

Fig 1 shows an apple tree in full bloom, during which period the important and essential work of pollination (the transference of pollen from the anther of a flower to the stigma) is effected principally by the honey bee. The bee works in a systematic manner, visiting the flowers of one kind of tree in rapid succession in search of nectar and pollen, at the same time acting as the principal agent in the pollination of the blossoms, which is essential to enable the fruit set to be completed.

To apply sprays which include arsenate of lead to the trees during this period is a definite waste of material and a financial loss to the grower, because codling moth is not active and the effects of the spray are negative. At the same time disastrous effects by poisoning may occur to bees visiting the blossoms for the nectar. It is evident, therefore, that spraying at that time of blossoming is detrimental to the interests of the fruit grower.

The recommendation of the Horticulture Division is not to include arsenate of lead in spray applications to apple and pear trees before at least 75 per cent. of the blossoms have fallen (see Fig. 2). After the falling of the petals certain flower parts wither, having fulfilled their purpose, and the attraction for the bee ceases. By adhering to this recommendation satisfactory control of codling moth in a normal season should be obtained with a minimum danger to the setting of the crop and without the loss of bees from arsenical sprays.

FROM WAR TO PEACE . . .

Illustrated is the 3½ h.p. Model. Delivery within a reasonable time can be arranged.

During the War, almost the entire production of LISTER DIESEL ENGINES to STANDARD specifications was taken over by the Armed Forces. No alteration in design was required to fit the LISTER for the gruelling purposes of War.

LISTER Engines of this same sterling quality are now available for YOUR Requirements.

PLACE YOUR ORDER IMMEDIATELY FOR DELIVERY ON ARRIVAL. REASONABLY EARLY DESPATCH CAN BE GIVEN.

You Can Rely Still More On a LISTER

LEVIN & Co., Ltd. **Distributors for New Zealand.**

CUSTOMHOUSE QUAY, WELLINGTON. P.O. Box, 1496. 'Phone 40-150

THE WORLD'S BEST

MILKING RUBBERWARE

Reidrubber

RR2

MAKE A REAL SUCCESS OF FARMING

To make your farm a real success, a sound business knowledge is essential. Realising this, the Farm Accounting Association has drawn up a correspondence course designed to give young farmers an all round business training in farm finance, bookkeeping, legal and other problems.

LET THEM HELP YOU—YOU WILL NEVER REGRET IT.

Send for free Brochure. Post this Coupon TODAY ...... ☞

The Farm Accounting Association of N.Z. (Inc.)
P.O. Box 693,
DUNEDIN.

Dear Sir,—Please send me without obligation your Association's Brochure and details of your home study course.

NAME..............................

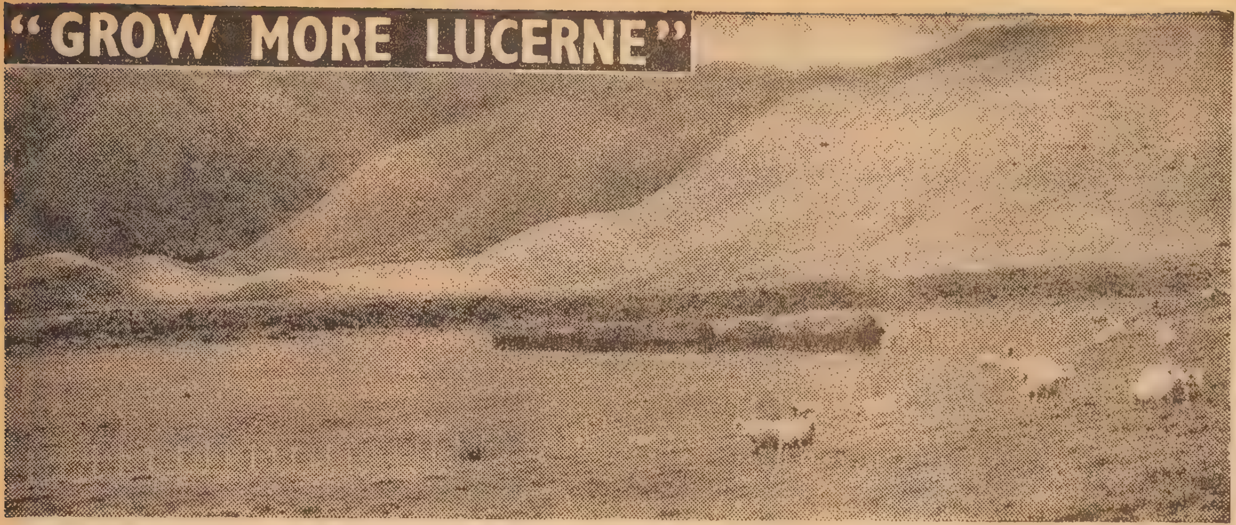
ADDRESS..............................

....

THE "N.Z. JOURNAL OF AGRICULTURE"

Subscriptions: 2/6 a year, 4 years 10/-. Overseas subscriptions: 5/- a year. Subscriptions may be paid at any office of the Department or direct to, The Publisher, Department of Agriculture, Box 3004, Wellington.

“GROW MORE LUCERNE”



"King of Fodders" Not Difficult to Establish

By C. R. TAYLOR, *Fields Instructor, Rotorua.*

LUCERNE, which has often been referred to as “the king of fodder crops,” richly merits such recognition. As a producer of the highest quality fodder, with exceptional yielding capacity and tolerance of a wide range of soil and climatic conditions, it has no equal. Farmers who have relied heavily on the drought-resistant qualities of lucerne have had feed for their stock when other fodder crops have failed during prolonged dry spells. Those who adopt “Grow More Lucerne” as a slogan for 1946 will be less dependent on the vagaries of the weather.

THE long dry spell experienced over a large part of the North Island last summer and early autumn will not readily be forgotten by farmers in affected districts who were unable to keep their stock alive without drawing heavily on whatever supplies of winter supplements they had managed to set aside. The unbalancing of feed supplies made the entire year one of difficulty and anxiety for many farmers.

It has frequently been said that one has to buy one's experience and that, having bought it, often at a high cost, one does not make the same mistake a second time. This is, perhaps, a somewhat hard philosophy, which is nevertheless lent point by the fact that the few farmers who possessed established stands of lucerne suffered far less during last season's drought than the greater number who had not. Some farmers actually increased their production over that of the previous season, simply because they had a sufficient area of lucerne over that required for supplementary winter feed to permit rationed grazing or for cutting and feeding green. Several of their neighbours called these farseeing farmers lucky, but surely the reward of good, sound management cannot be called luck.

After the experience of last summer increasing interest is likely to be shown in lucerne by farmers this spring. Inquiries already received indicate that there will be a substantial additional acreage sown, and the essentials in the establishment and management of a lucerne stand are dealt with in this article.

Contrary to a rather widespread, but erroneous, opinion held by many farmers, lucerne is not really difficult to establish or manage, provided attention is given to a few fundamental principles. Where lucerne stands have not proved altogether successful one almost invariably finds that some vital practice has been overlooked which, if appreciated and carried out, would have yielded very different results.

Soil and Situation

Well-drained, fertile, and open soils of a loamy nature are unquestionably best for lucerne. Due to its extremely deep rooting system lucerne will not thrive where there is a stiff sub-soil or soil pan to be penetrated, nor will it develop normally when the water-table is too close to the surface. For best results the soil where lucerne is to be grown requires to be fairly well enriched with humus and other plant foods, and for this reason lucerne should not generally be sown on poor country just developed from fern and scrub; rather should it follow old pasture that has been down for some years and well stocked.

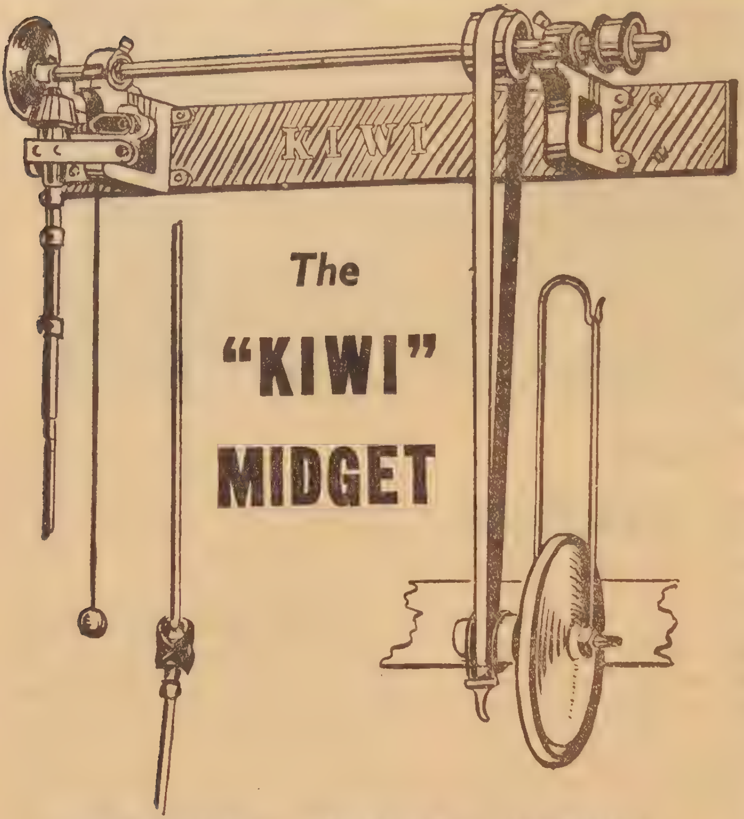
Areas likely to cause trouble from weeds and twitchy grasses should be avoided in selecting a site for lucerne, which in its early stages of growth is not a particularly strong grower, and any undue competition from weeds may adversely affect its subsequent usefulness. It is not impossible, however, to obtain successful stands of lucerne in the presence of weed competition; hundreds of excellent stands have been established throughout the high-rainfall areas of both islands where the ground is subject to weed invasion, but less work will be entailed in establishing the stand if the farmer studies all the possible sites he may have, and then chooses one as near to the ideal as he can. It is not advisable to use land that has recently been under crop unless steps are first taken to free the area of weeds before sowing the lucerne.

Finally the selected site should be reasonably flat to facilitate harvesting operations, and if it is on a warm northerly slope so much the better.

Cultivation

Farmers who have had experience in the sowing of turnips and clovers know that it is fatal to sow the seed of such crops too deep, and so it is with lucerne. Because of this a well-prepared seed-bed adequately firmed by rolling is imperative.

"MIGHTY ATOM"



The "KIWI" MIDGET

- Ideal for small flocks.
- Ball-bearings throughout.
- Easily erected or dismantled.
- With or without grinder.
- Patented cam clutch.
- All accessories supplied.

ONE-STAND SHEARING MACHINE

Here's the finest machine on the market designed for the smallholder. It is the simplest and easiest operated machine of any make, and it can be assembled or dismantled very quickly. Four bolts are all that is necessary to fit the outfit to any wall or posts. Make further enquiries about this practical and reliable job.

"New Kiwi" Sheep Shearing Machines —Electric, Standard, Portable and Midget . . . Burgon and Ball Sheep Shears . . . Cockshutt Ploughs . . . Frost & Wood Mowers . . . Peerless Hay Rakes . . . Federal Topdressers . . . Federal Disc Harrows . . . Hercules Super Discs . . . Federal Tine Harrows . . . Ideal Chain and Tripod Harrows . . . Federal Saw Benches.

M. J. HOOPER

In association with the New Kiwi Sheep Shearing Machine Co., Ltd.

88-90 Federal St., AUCKLAND

POST NOW FOR CATALOGUE Free

M. J. HOOPER & CO., LTD.,
88-90 Federal Street, Auckland.

Please send me a Free Copy of your fully illustrated catalogue of Modern Farm Implements.

NAME ....

ADDRESS ....

....

J.A.

Ploughing should be done well ahead of the time of seed sowing to give any vegetation turned under a chance to decay properly, and also to give an opportunity of destroying by surface cultivation as many weed seedlings as practicable. In some districts skim ploughing in the autumn or early winter followed by a deeper ploughing in late winter or early spring will prove worth the trouble and extra work. In other localities, chiefly where soils are light and free working, one ploughing, 5 to 6in. deep, in the late winter or early spring will suffice.

Whatever practice adopted will be governed by local knowledge of soil and climate, but the paramount need is for a good depth of free-working soil adequately rolled with a Cambridge roller to ensure satisfactory consolidation. It should be remembered that subsequent discing and harrowing to bring about a satisfactory seed-bed should not be so drastic as to disturb the original surface layer turned under by the plough, otherwise endless trouble from weeds and grasses will result.

In certain districts the only site available for lucerne may be one which recently carried an annual crop. In most instances lucerne sown in such an area may do quite well, especially under South Island cropping conditions where the ground is kept reasonably weed free by inter-row cultivation, but in the North Island where such crops as turnips, swedes, and chou moellier are generally broadcast the land often becomes thoroughly fouled with a miscellaneous collection of weeds which would prejudice establishment of lucerne. It is by no means uncommon, particularly in the Auckland Province, for lucerne to be completely smothered by fast-growing annual weeds when sown directly after a "dirty" crop. This may be largely overcome if weedy ground is first sown to a greenfeed crop, such as barley and oats, with or without tares, and the thicker it is the better it will smother out undesirable weeds.

Such smother crops should be fed off early enough to enable ploughing to begin not later than mid-October, but any loss of grazing at this time is more than compensated for by the resultant cleansing of the land, and the increased soil fertility incidental to heavy stocking and the ploughing in of the crop residue.

As a general rule all land being prepared for the sowing of lucerne should, subsequent to ploughing, but some weeks before sowing, receive repeated light surface cultivation during fine weather to bring weed seeds to the surface, where they germinate freely and are destroyed by the cultivation that follows. Such cultivation should not be more than, say, 2in. deep; otherwise consolidation is apt to be destroyed, partially-rotted turf brought to the surface, and the weed problem actually increased instead of reduced.

Liming

With certain few exceptions, mainly isolated areas in the South Island, nearly all the soils of the Dominion must be heavily limed as a prerequisite to success with lucerne. It is probable that no crop responds so well to a liberal dressing of lime as does lucerne, and for this reason it is common practice to use from 15cwt. to 1 ton an acre as an initial application.

This is best worked into the soil during final cultivation where it is given every opportunity of being acted upon by the soil moisture, and thus brought into a condition to benefit quickly the young lucerne seedlings and the bacterial life associated with these plants.

Annual dressings of lime applied to established stands are advisable, the rate varying between 3cwt. and 8cwt. an acre according to the lime status of the soil.

Manuring

When fertilisers were plentifully available before the war the normal rate of manuring lucerne appeared to vary between 2 and 4cwt. an acre—usually the latter figure of superphosphate at time of sowing the seed or worked into the land just before sowing.

Owing to the harmful effect soluble fertilisers like superphosphate have on the inoculated (bacteria-coated) seed of lucerne, it is customary to mix with the fertiliser an equal quantity of lime some days before sowing. Used in this manner superphosphate has no detrimental effect on germination or on the inoculating organisms. As serpentine superphosphate and basic slag are already neutral in reaction, they are perfectly safe to use as manufactured.

First cut of the second season. This stand was spring sown and was badly infested with fat-hen and *Amaranthus* soon after sowing. Control methods described in the text were very effective.

THIS SEASON USE

NECADOK

A DOCKING FLUID OF PROVED MERIT

Necadok is Antisetic, Healing and Astringent

- It checks bleeding and promotes Healthy and Rapid Healing.
- It is not washed off by rain and is recommended for all stock wounds.
- Well known breeders write: "My losses with Necadok were practically nil."

***Remember to Specify* NECADOK!**

Pints 5/1, Quarts 9/8, Half Gallons 17/7, Gallons 29/6 (one gal. will dock 1000 lambs).

ASK YOUR MERCHANT TO OBTAIN FOR YOU.

AGENTS IN NEW ZEALAND: ALL BRANCHES OF THE FARMERS' CO-OP., Companies and Associations.
In Hawke's Bay obtainable from WILLIAMS & KETTLE, LTD.

IMPLEMENT SPARE PARTS

McCormick Sections, Ledger Plates, Fingers.
Massey Harris Sections, Ledger Plates, Fingers.
Allis Chalmers Sections, Ledger Plates, Fingers.

The above are Genuine and Willfit Parts.

Mouldboards — R. & G. No. 5.
Skeith Blades—16in., 17in. and 18in.
Chaffcutter Knives—HH7 F7 and F1.
Chain, Malleable and Steel — 55, 52, 45.
Pegs—McCormick Header and Mill.
Harrow Tines, Cultivator Points, etc.

The above are of English and American manufacture and are available from stock.

DORING IMPLEMENT SUPPLIES

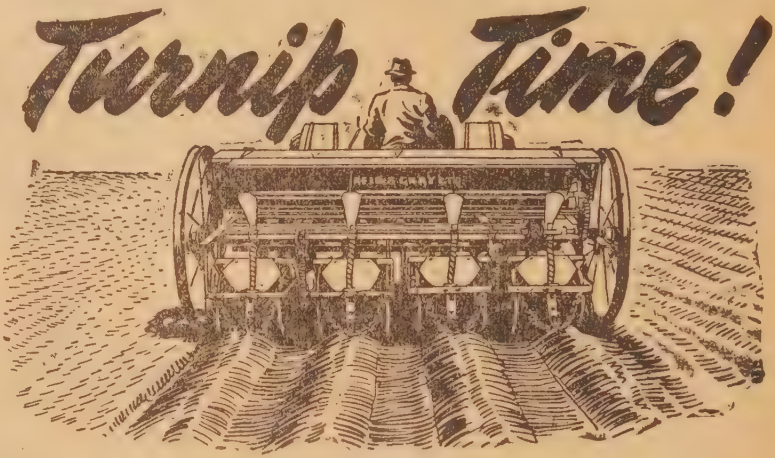
P.O. BOX 1179, WELLINGTON.

D.2.4

FARM LIGHTING BATTERIES

New plate groups to replace worn glass jar cells. Fit any make glass or rubber jars. Guaranteed. Also complete new cells in rubber cases. State make, number plates per cell dimensions of jar.
Rokfire Electric Batteries, Ltd
P.O. Box 66, Petone.

Subscriptions to the "Journal of Agriculture" (2/6 a year) may be paid at any office of the Dept. of Agriculture or to the Publisher, Box 3004, Wellington.


Turnip Time!

R. & G. RIDGERS

You can be sure of best results from your turnip crop if you use a R. & G. Improved Turnip Ridger. Available in two- and four-row machines, with one-piece welded angle steel frame and unbreakable steel wheels with welded rims. Each pair of discs has independent action to conform to uneven ground, and has sealed oil centres. A mechanically operated automatic lift raises the discs and rollers clear of the ground and releases the gears.

IMPROVE CROP CULTIVATION WITH R. & G. DISC SCUFFLER.

The R. & G. Disc Scuffler will not interfere with plants on high drills. High guide rollers and main axle give plenty of clearance. Discs, under spring pressure and lever controlled, can be set at any angle, clearing right up to the root. Available in 2-row for horse, and 4-row, with automatic lift, for tractors.

REID & GRAY LTD.

HEAD OFFICE and WORKS: BURNSIDE, OTAGO.
BRANCHES at INVERCARGILL, GORE and BALCLUTHA.

AGENTS—*Auckland*: Alfred Buckland & Son, Ltd. *Hamilton*: A. M. Bisley & Co. *Gisborne*: The Machinery Exchange Agency. *Palmerston North*: Reid & Gray Agency, Ltd. *New Plymouth*: J. B. MacEwan & Co., Ltd. *Masterton and Nelson*: Levin & Co. *Blenheim*: R. Cresswell & Sons. *Christchurch, Ashburton, Timaru, Waimate, and Oamaru*: National Mortgage and Agency Co., Ltd.

The first cut of the season is often best made into silage.

Sowing the Seed

The Marlborough strain of lucerne can be strongly recommended for general employment throughout the Dominion, as no other strain has so far been demonstrated to equal its productivity, long life, and general usefulness.

Lucerne should be sown only on a well-prepared and consolidated seed-bed if an even strike of vigorous seedlings is desired. Anything short of this minimum requirement generally results in a patchy strike and later difficulty in controlling weed growth.

Since lucerne is a warmth-loving plant, there is nothing to be gained by sowing early while the soil temperature is still low. Far better results will generally be secured by delaying the sowing date until between mid-November and mid-December. In some districts of the North Island autumn sowing is practised with good results, as much of the weed growth incidental to spring sowings in these localities is thus avoided. As a rule, however, autumn sowings are not as satisfactory as a spring seeding, because the young seedlings very seldom have sufficient time to develop into strong plants before their dormant season commences.

Lucerne may be sown through every coulter of a grain drill or broadcast through a manure distributor. Both methods give satisfactory results when the seed-bed has been well prepared and firmed by rolling. Seed should be drilled at 14 to 18lb. an acre, and up to 25lb. may be used when broadcast. Owing to the relative scarcity of drills in the North Island, it is more common to mix seed and manure together and sow through the topdresser. Seed is then lightly covered by a brush harrow or light chains. When drilled, if half the seed is sown in one direction and the other half at right angles to the first, any misses are avoided and a very even stand results.

Inoculation

Before lucerne seed is sown it should be "inoculated" on the farm. This simple but highly essential process ensures that the lucerne crop is amply provided with a special micro-organism which has the ability to take in atmospheric nitrogen and change it into a form capable of being assimilated by the plant. Without an adequate supply of this organism in the soil—and most soils in this country are deficient in it—lucerne soon after germination turns a yellowish colour, lacks vigour, and dies.

Many lucerne failures can be definitely traced to a grower's lack of appreciation of the great importance of this aspect of lucerne culture, even though all other phases of initial preparation have been undertaken in a faultless manner, and failures in the establishment of lucerene can almost invariably be related to the degree of efficiency attained in introducing the nitrogenising organism into the soil.

Not so many years ago the only known method of inoculating lucerne was to take soil from an established stand and spread it evenly over the area where a new crop was to be sown. The time and cost involved can be imagined. Later on, however, scientists discovered the easy method now used of merely inoculating the seed with a laboratory-prepared culture of the organism. This culture costs very little to purchase, is easily applied to the seed by the farmer, and removes all risk of failure from this aspect of lucerne establishment. Full instructions in the use of lucerne culture are supplied with the purchase, but it should be repeated that inoculated seed should on no account come in contact with soluble manures like superphosphate or sulphate of ammonia when being sown.

Treatment After Sowing

According to time of sowing, efficiency of seed-bed preparation, and locality of stand the treatment required in the first few months is likely to vary considerably. In circumstances approaching the ideal it would not be necessary to do anything until the crop was in flower or young shoots had appeared at the base of the plant, when cutting could be undertaken. Under less favourable conditions it is probable that weeds whose growth is more rapid than that of the lucerne will cause some trouble. If it is necessary to cut the crop sooner to prevent it being smothered by weeds of a tall, vigorous variety, such as fat-hen or Californian thistle, the mower knife should be set as high as possible and the cut material carted off the field. This may have to be done two or three times in some districts—particularly in parts of the Auckland Province—before the lucerne is strong enough to compete on even terms with the weakened weed growth. Since the most troublesome weeds are only annuals, an earnest effort in the first season to prevent

FARM for
PROFIT!

LEARN THE
BUSINESS
SIDE OF FARMING . . .

What to watch in buying a farm . . . how to finance and start on your own . . . how to keep simple books that give you a monthly record of your profit and loss . . . useful tips on the law that every farm manager should know . . . these are only some of the essential details taught by the Druleigh Book-keeping and Management Course. It teaches you to take out your own Balance Sheet and Income Tax Returns . . . to become an efficient farmer.

Druleigh's special Diploma Course of Home Study training on Farm Management, Farming Law, and Farm Book-keeping is specially written by experts. A wonderful investment for any young man who wants to make farming pay.

BE A SUCCESSFUL FARMER!

DRULEIGH College of
FARM BOOK-KEEPING
VULCAN LANE, AUCKLAND.

Dear Sirs,—Please send me, without obligation, full details of your simplified Farm Book-keeping and Management Course.

NAME ....

ADDRESS .... J.A.

IT'S
• EASY TO USE
• EFFICIENT
• RUNNING COST
6d AN HOUR
• WEIGHT 28lbs

ERADICATE NOXIOUS WEEDS
with the
BEST BURNER
IT IS *NOT* A FLAME THROWER

but a concentrated gas heat with pressure created by its own expansion—no pressure pumping required.

For Full Details, send for Free Pamphlet.

The Best Burner, Ltd.,
46 Tuam Street, Christchurch,
P.O. Box 291. 'Phone 33-851. J.A.

POST THIS COUPON.

Name ....

Address ....

SPREAD WITH CONFIDENCE

Challenge

MANURES

Products of

CHALLENGE PHOSPHATE CO. LTD., AUCKLAND

them from seeding will prevent their recurrence in subsequent years.

Provided weed growth is not serious, lucerne sown in November should normally be ready for a first cut in early February in warm districts and for a second and final cut in April. In the colder localities it may be late February before the first cut is possible, and often in these circumstances it may be unwise to take a second cut in the first season unless climatic conditions are favourable.

The correct time to cut lucerne is when new shoots appear at the base of the plant, and **not** necessarily when, say, 25 per cent. of the crop is in flower, as was the old-time practice. Usually when a substantial part of a lucerne stand is blooming the basal shoots have grown several inches long, and these are mown off along with the cut that is being taken. This practice not only greatly reduces the yield from the following cut, but if it is persisted in, it tends to weaken the root system. Actually this is the cause of considerable trouble in established lucerne stands, and the reason for premature failure of many of them. Moreover, late-mown cuts lose much of their food value owing to the loss of leaf and the woodiness of stems.

Topdressing

Annual dressings of phosphates are advisable to maintain the high production of which a good lucerne stand is capable. From 2 to 4cwt. annually are generally considered sufficient for most districts, although it is known that in parts of Otago little or no response is shown to either lime or phosphates. For best results over most of the Dominion topdressing should be done in the spring just after the lucerne has made appreciable growth, or alternatively immediately following the first cut of the season. Local climatic conditions must, however, determine which of these alternatives is the more practicable. In very dry districts topdressing may be, and often is, applied in the winter, but under conditions of relatively high rainfall in which grass and other extraneous growth are likely to invade the stand, application of phosphate dressings in winter while the lucerne is still dormant only encourages weed growth without bringing a corresponding benefit to the lucerne.

General Management

As with all other farm crops, success with lucerne entails good management. The wide range of conditions under which lucerne is grown in this country makes it impossible to prescribe hard-and-fast rules for a system of management; suitable methods must be worked out according to the need at the time.

Generally, however, the chief need will be for weed control, especially at the end of winter following the dormant season for lucerne. Little cultivation can be done at this time, as the ground is usually wet and sticky and any displaced weeds quickly take root again. It is better to mow the field with the knife bar set high when the new spring growth of lucerne is about 2in. high, cut material being left to decay.

Sometimes a light grazing is advantageous at this stage, but on heavy soils it would be wiser to use the mower.

This is a suitable period in which to apply from 2 to 4cwt. of phosphate as a topdressing.

The first cut of the season is usually taken in November, but because of weather conditions and the proportion of grasses and weeds in the crop at this time it is customary to make this cut into silage rather than hay. Where weeds are threatening to flower and seed, early cutting should be the rule rather than the exception. Some growers are inclined to leave mowing a little late in the hope of securing a heavier yield, but the risk is unjustified if weeds are on the point of distributing their seeds.

Following the first cut in November, lucerne should ordinarily be at a suitable stage for further mowing in January. This cut and those made in late February or early March and the final one in April are generally made into hay, the weather over this period lending itself to hay-making, while the weed nuisance is then infinitesimal.

It cannot be too strongly emphasised that the last cut should not be taken so late in the autumn that a reasonable leaf growth before the dormant period commences becomes impossible. Many good stands have been permantly injured by this practice, for healthy root development can take place only during the off-season with the assistance of 3 to 4in. of top growth. Bare stubble, the result of late cutting, is useless for this purpose, and the whole of the following season's crop is detrimentally affected. Growers should therefore consider limitations of

The second and subsequent cuts of lucerne are usually saved as hay.

HIGHEST PRICES FOR DEERSKINS!

PROMPT RETURNS.
SKINS GRADED IMMEDIATELY.
CHEQUES POSTED SAME DAY.

It costs you nothing to consign your Skins to me. I pay all freight costs.

R. J. CRAWFORD
34 RATTRAY STREET, DUNEDIN.

"MARK MY WORDS SON"
CAMFOSA
TEAT SALVE

You should always rely on a proven product like "Camfosa" Teat Salve for treating cows. It's your best insurance against udder troubles, sore and cracked teats, etc. Besides, it does not taint the milk.

SOLD EVERYWHERE
2/2, 3/10 & 7/2

CAMFOSA *Teat salve*

DOES NOT TAINT THE MILK

Manufacturers: FRANK JACKSON LTD., 535 Parnell Rd., Auckland.

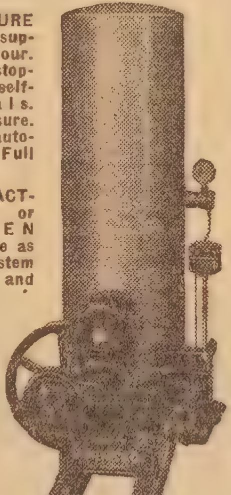
Now's the time to Instal a

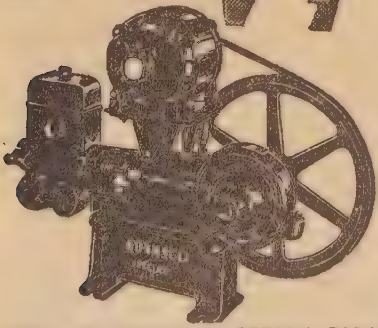
'BURNSCO' WATER PUMP!

AUTOMATIC PRESSURE SYSTEM as at right supplies 230 gals. per hour. Self-starting, self-stopping, self-priming, self-lubricating. 45-gals. capacity. 60-lbs. pressure. Tank Air Supply automatically controlled. Full details on request.

Below: DOUBLE ACTING ELECTRIC or PETROL DRIVEN WATER PUMP. Same as fitted to Pressure System above. Self-priming and lubricating. 120-ft. head (or higher). Rubber valves. Bronze seats, easily accessible without disturbing connections. Stainless Steel Piston Rod, etc.

We Stock Pumps For All Purposes. Enquiries Welcome.





CALL OR WRITE FOR DETAILS TODAY.

JOHN BURNS & Co. LTD.

Head Office: CUSTOMS ST., AUCKLAND.
Branches in All Centres.

for

BETTER WALLS AND ROOFING

Build with

HARDIE'S *Genuine* **FIBROLITE**

You cannot do better than to use HARDIE'S "FIBROLITE" ASBESTOS-CEMENT SHEETS for any Farm Building. First Cost is LOW, maintenance is negligible . . . Fire Risks reduced to a minimum. HARDIE'S "FIBROLITE" ASBESTOS-CEMENT SHEETS can be used for External and Internal Walls as well as for Ceilings . . . Is also White Ant and Borer Proof.

PERMANENCE AND SOUND ECONOMY ENSURED

Stocked by Leading Building Supply Merchants.

Please send me "Fibrolite" Homes Booklet FREE and Post Free

Name

Address

SOLE MANUFACTURERS:
JAMES HARDIE AND COY. PTY. LTD.
PENROSE, AUCKLAND, N.Z.
POSTAL ADDRESS: PRIVATE BAG, AUCKLAND.
and at SYDNEY MELBOURNE BRISBANE PERTH

J.A.

F.S.

Oversowing of lucerne stands after last cut in April provides a heavy bulk of green material for ensiling the following November. The stand in the photograph was oversown with Italian ryegrass.

their local conditions and not expect too much of their lucerne stands.

The cultivation of a lucerne stand should never be more drastic than is necessary to control weed growth adequately, or to bring about a friable mulch of surface soil without unduly harming the lucerne. In very low rainfall areas weeds are not likely to be the cause of much trouble, and sufficient cultivation during dry weather to furnish a soil mulch an inch or so in depth may be all that is required.

Where rainfall exceeds 30in. an increased weed problem may be expected. It is useless to attempt to deal with weeds in lucerne during the winter and spring while the soil is wet; the only time this can be accomplished successfully is immediately following the second or third cuts, in January or late February. Even then cultivation is most effective on light, friable soils where weeds can be easily uprooted without materially injuring the crowns of the lucerne.

On the heavier types of soil it is probable that more harm than good will result from cultivation, for the amount of working frequently necessary to disturb weeds will also seriously disturb the lucerne.

Implements suitable for lucerne cultivation are more or less restricted to those fitted with narrow, sharp-pointed, penetrating tines. Thus tine harrows, spring-toothed cultivators, and certain modern grassland harrows will give good results when properly handled. Disc harrows should not be used.

The oversowing of lucerne with barley, oats, Italian ryegrass, or prairie grass after suitable cultivation following the last cut of the season in April is becoming increasingly popular in many parts of the North Island. This is not harmful to the lucerne, keeps weeds under control during the winter, and greatly increases the bulk of material available for ensiling in November. The usual quantities of seed used for oversowing are as follows:—

	Per acre
Oats or barley ..	½ to 1 bushel
Italian ryegrass	15 to 20lb.
Prairie grass ..	40 to 60lb.

From 2 to 3cwt. of phosphatic fertiliser could be sown at this time to stimulate the oversown crop.

Diseases

Lucerne is seriously affected by only one disease in this country. *Sclerotinia trifoliorum*, or stem rot, is a fungus disease which appears as circular or oval patches in the stand where plants are dying out or have died. As far as is known at the present time the most effective way of controlling this disease is to apply freshly-prepared hydrated lime to the diseased areas at the rate of 1½lb. per square yard and the stand should be kept cut to let in the sun and air and lower the humidity. If stem rot is troublesome, cultivation of a stand should be either dispensed with or carried out very carefully to avoid spreading the infection to healthy areas.

Leaf spot is another disease which occasionally attacks lucerne. It is characterised by the spotting of leaves with small brown or black spots, and is most commonly associated with unsuitable growth conditions. Leaf spot is not serious and usually clears up completely following improved methods of management.

Lucerne is not a difficult crop to grow or to manage. Its feeding value far exceeds that of meadow hay, and when once established its resistance to adverse weather conditions is outstanding. It may be made into either silage or hay, cut and fed green, or even grazed lightly at certain periods. It should be grown far more than it is at present, for it contributes considerably to the general well-being of livestock.

All photographs by the author.

N.Z. CRIMSON KING SWEDES

An Adaptable Main Crop Variety

IN the article "Turnip and Swede Crop" in the September issue of the "Journal" a typographical error was responsible for a double reference to N.Z. Sensation swede and the omission of N.Z. Crimson King. On page 221 in the middle column the first of the paragraphs headed "N.Z. Sensation swede" should read "N.Z. Crimson King swede: Purple-". Crimson King represents the general main crop type and is adaptable to a wide range of soil and climatic conditions.

Standard Poultry Mash Ingredients

IN the September issue of the "Journal of Agriculture" details of the ingredients of the two standard poultry mashes, and advice on how to use them to the best advantage, were published for the benefit of poultry producers. Unfortunately, soon after the "Journal" had gone to press the Department of Agriculture was forced by circumstances beyond its control to amend the formulae of these mashes.

A NUMBER of districts in the Dominion had insufficient meat meal available to allow the inclusion of 5 per cent. in the laying and chicken mashes. The details in the September issue should therefore be disregarded.

Because of present shortage of meat meal, licensed manufacturers are permitted to mix and offer for sale the four types of mash below.

The only difference between No. 1 and No. 2 of each type of mash is the presence or absence of meat meal. No. 1 type in each case has a full complement of protein or meat meal and requires nothing added. Poultry producers having supplies of meat meal on hand, or wishing to use some other source of protein food such as skim-milk or curds, can buy the No. 2 type and add their own requirements of protein feed.

Some licensed manufacturers are mixing all four types of mash, but where meat meal supplies are difficult to obtain at present only mashes without meal (type No. 2) are on sale. The Department of Agriculture proposes to review the position again at the end of the year when the killing season has started, and may then require that only mash containing meat meal shall be manufactured.

To prevent mistakes, licensed manufacturers are required to brand all sacks of mash clearly, indicating whether meat meal has been included or not. All brand marks IN BLUE indicate that the mash contains 10 per cent. meat meal; all brand marks IN RED appear on bags containing mash WITHOUT MEAT MEAL.

The Standard Mashes

STANDARD LAYING MASH

	No. 1 lb.	No. 2 lb.
Bran	25	27
Pollard	20	22
Wheat meal	20	22
Ground oats **Barley meal** **Maize meal** } alternative ingredients	21	25
Meat meal (60 per cent. protein)	10	None
Minerals (1 per cent. common salt, 1 per cent. ground carbonate of lime)	2	2
Metal grit	2	2
	100	100

STANDARD CHICKEN MASH

	No. 1 lb.	No. 2 lb.
Bran	25	28
Pollard	19	21
Wheat meal	24	26
Maize meal	18	21
Meat meal	10	None
Minerals (1 per cent. common salt, 1 per cent. ground carbonate of lime)	2	2
Mineral grit	2	2
	100	100

N.Z. STANDARD
NO. 1
LAYING MASH
WITH
MEAT MEAL

N.Z. STANDARD
NO. 2
LAYING MASH
NO
MEAT MEAL

The design on the left is required for standard laying mash containing 10 per cent. meat meal, and shall be marked on the sack in BLUE. The design on the right is required for standard laying mash to which no meat meal has been added, and shall be marked on the sack in RED.

N.Z. STANDARD
NO 1
CHICK MASH
WITH
MEAT MEAL

N.Z. STANDARD
NO. 2
CHICK MASH
NO
MEAT MEAL

The design on the left is required for standard chick mash containing 10 per cent. meat meal, and shall be marked on the sack in BLUE. The design on the right is required for standard chick mash to which no meat meal has been added, and shall be marked on the sack in RED.

Show Dates

October 31, November 1, 2—Waikato A. and P. at Hamilton.
November 1, 2—Wairarapa and East Coast A. and P. at Carterton.
November 2—Timaru A. and P. at Timaru.
November 7, 8—Canterbury A. and P. at Christchurch.
November 8, 9—Manawatu A. and P. at Palmerston North.
November 9—Kaikohe A. and P. at Kaikohe.
November 15, 16—Poverty Bay A. and P. at Gisborne.
November 15, 16—Wanganui A. and P. at Wanganui.
November 15, 16—Whangarei A. and P. at Whangarei.
November 16—Courtenay A. and P. at Kirwee.
November 16—Taieri A. and P. at Mosgiel.
November 20—North Otago A. and P. at Oamaru.
November 22, 23—Nelson A. and P. at Nelson.
November 22, 23—Egmont A. and P. at New Plymouth.
November 23—Banks Peninsula A. and P. at Akaroa.
November 23 — Otago Metropolitan Summer at Tahuna Park.
November 23—Bay of Islands A. and P.
November 23—West Otago (Kelso) A. and P. at Kelso.
November 29—Clutha and Matau A. and P. at Balclutha.
November 29, 30—Stratford A. and P. at Stratford.
November 30—Winton A. and P. at Winton.
November 30—Hauraki A. and P. at Paeroa.
December 3, 4—Gore A. and P. at Gore.
December 7—Wyndham A. and P. at Wyndham.
December 7—Motueka A. and P. at Motueka.
December 7—Tokomairiro A. and P. at Milton.
December 10, 11—Southland A. and P. at Invercargill.
December 21—Peninsula A. and P. at Broad Bay.
January 1—Nuhaka A. and P. at Nuhaka.
January 10, 11—Wairoa A. and P. at Wairoa.
January 11—Blueskin A. and P. at Waitati.
January 17—Waikouaiti A. and P. at Waikouaiti.
January 24, 25—Taumarunui and District A. and P. at Taumarunui.
January 25—Helensville A. and P. at Helensville.
January 29—Tauranga A. and P. at Tauranga.
January 29—Marton A. and P. at Marton.
January 30, 31—Hawke's Bay Ram Fair at Napier.
January 31, February 1 Horowhenua A. and P. at Levin.

Establishing Pastures on Second-growth Burns

By E. G. STAINTON, *Fields Instructor, Taumarunui.*

UNDOUBTEDLY the whole of the formerly bush-clad hill country of the North Island would readily revert to secondary growth if the stock were removed. Sound management, which includes proper stocking and selection of suitable grasses, is imperative to farm hill country successfully. Secondary growth is the outcome of deferred maintenance, and if it is allowed to take charge the ruination of the land affected has begun.

SECONDARY growth usually comes in on grassed hill land of low fertility, whether of easy slope or hilly and steep. If such land is ploughable, the fertility can readily be increased by cultivation and the use of suitable fertilisers to enable a good pasture to be established from seed mixtures including cocksfoot, crested dogstail, Certified perennial ryegrass, browntop, white clover, and *Lotus major.* But on steeper land greater care must be taken in the selection of a seed mixture because the chances of reseeding are much less.

One possible reason for the encroachment of secondary growth is the sowing of unsuitable species of grass seed originally. If such species are sown, the resultant pasture will be non-permanent, and manuka and other pioneer plants will soon come in. If proper seed species were sown originally, there would be fewer spaces in the sward and secondary growth would at least not be so prevalent.

The longer the secondary growth is left growing the bigger and denser it becomes, with the result that when it is felled and burnt considerable ash is available to cover the seed. But where the growth is thin, insufficient ash is available and other means of covering the seed must be resorted to, such as the tramping of the seed-bed by comparatively large numbers of sheep.

On steep land especially it is essential to know the values of the grasses selected for the quality and steepness of the country and whether it is intended to topdress regularly, or disappointments are sure to be experienced. In the King Country generally perennial ryegrass will not hold unless the fertility of the soil is maintained by a strong growth of clovers, and for that topdressing is necessary.

Hill country is used solely for grazing and therefore permanent pastures are always the aim. On bush and second-growth burns grass is sown down once and for all, and because the land is unploughable there is seldom an opportunity for renewing the pasture. Therefore it is obvious that a proper choice of grasses is very important.

Controlling Secondary Growth

Much hill country of the North Island, including the King Country, rapidly reverts to manuka and later to other secondary growth, particularly under poor management. To control such growth it is imperative for man and stock (chiefly run cattle) to work in conjunction—men to cut or pull the rank manuka growth and stock to control the seedlings as they appear.

When the land becomes covered with second growth, felling, burning, and regrassing are the only practical methods to bring the country back into production. These three operations depend on one another for ultimate success. If the cutting is "slummed," the fire cannot do its work properly by leaving a good clean seed-bed, without which much valuable grass seed will be wasted.

The method of cutting the secondary growth is most important. The stems should be cut as close to the ground

A poor burn and a poor strike of grasses may lead to rapid ingress of weeds and secondary growth.

HIGH
mineral content

Every bag of Summit Mineral Stock Food that leaves the Summit factory is guaranteed to contain Pure Bone Flour, Flowers of Sulphur, Cobalt, Salt, Limonite, Meal, Molasses, Sulphate of Iron, Calcium, Potassium of Iodide, Phosphates, Charcoal, Sulphate of Magnesia, and other constituents.

LOW
feeding cost

The cost of feeding Dairy Cows Summit is definitely LOW. The cost per cow per week is less than 1¼d., and the following gives you the cost of feeding Summit to a whole herd:

20 cows .. £5 14s. per annum per herd
50 cows .. £14 5s. per annum per herd
100 cows .. £28 10s. per annum per herd

You Get Both in

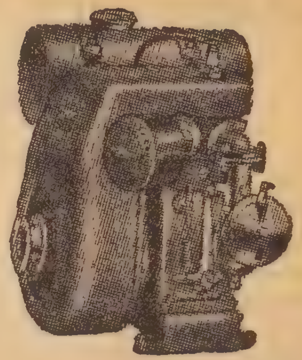
SUMMIT
MINERAL STOCK FOOD

SUMMIT MINERAL STOCK FOOD CO.,
Limited,
517 Main St. - PALMERSTON NORTH

Agents and Stockists throughout the North Island.

SUBSCRIPTIONS

Subscriptions to the "Journal of Agriculture" (2/6 a year or 10/- for four years) may be paid at the offices of the Department of Agriculture at Auckland, Wellington, Christchurch, or Dunedin, or may be sent direct to the Publisher, Box 3004, Wellington.



Villiers

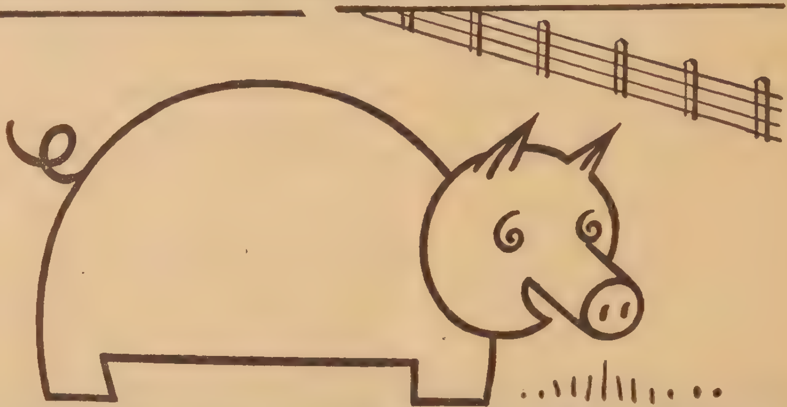
the LIGHT-WEIGHT ENGINES
with the
BIG POWER OUTPUT

VILLIERS Engines are built in the largest factory in the world making light-weight engines. Over 50 years' progressive design and development have produced an engine second to none for efficiency and dependability.

VILLIERS Will Power:
GENERATORS . CULTIVATORS . SHEARING MACHINES . VACUUM PUMPS . WATER PUMPS . CHAIN SAWS . COMPRESSORS, etc.

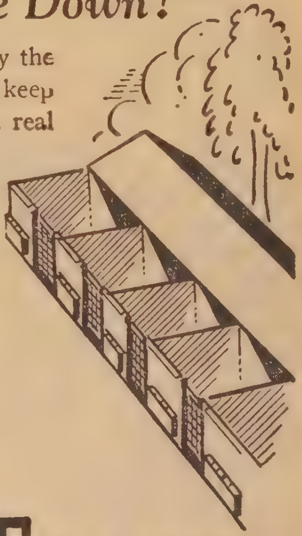
1 h.p.	.. ..	£26/5/-
2 h.p.	.. ..	£39/7/6
2½ h.p.	.. ..	£50

Factory Representatives: F. W. CAVE LTD., P.O. Box 1685, Auckland.



"You Can Huff and Puff but You Can't Blow My House Down!"

PIG pens built in concrete not only defy the elements and old age but are easy to keep clean and free from pests. Concrete is a real lifelong investment on the farm and pays handsome dividends. Send a postcard stating what you wish to build in concrete and we will forward full instructions, free.



WILSONS
N.Z. PORTLAND
CEMENT

For the Farm

Wilsons N.Z. Portland Cement Ltd., South British Insurance Building, Shortland Street, Auckland.

as possible so that everything will be cleared and burnt. Equally important is the time of year. First of all it is necessary to dry the scrub without it losing all its leaves, because without these leaves there will be nothing to carry the fire. Secondly, sufficient time must elapse to ensure that the sap in the stems has dried out so that a clean burn may be obtained. Cutting should be completed by the end of November, as in an ordinary summer the drying out is completed in about three months.

Before being burnt all the felled material should be forked back a safe distance from fences. Should the felled area be only part of a large block of scrub, or should it adjoin bush, similar precautions are necessary, and a firebreak at least a chain wide should be cleared. If the area to be burnt is near a boundary fence, or if the remotest chance exists of the fire spreading, neighbouring farmers should be advised in plenty of time of the approximate date of the burn.

By about the end of February or the beginning of March the cut material should have dried out sufficiently for a clean burn. At that time of the year not many days are ideal for burning and a suitable opportunity must be awaited. The wind should be gentle and in the required direction. When the felled scrub is on the face of a hill extra care is needed in selecting the day, as it is important to have a gentle wind blowing up the hill to fan the fire. When conditions are as favourable as possible the fire should be started at the foot of the hill, and a good seed-bed should result.

Seed Mixtures

After the burn the seed should be sown as soon as the ash is cold and conditions suitable. On steep and unploughable papa soil on a wet shady face the following mixture has proved very suitable:

	lb. per acre
Crested dogstail	4
Certified perennial ryegrass	8
Browntop	3
Yorkshire fog	4
Danthonia pilosa	1
Certified white clover	1
Lotus major	1
Total	22

The addition of, say, 3lb. of paspalum and ¼lb. of yarrow an acre may be advisable.

For drier and sunnier hills the following can be recommended:

	lb. per acre
Crested dogstail	3
Certified perennial ryegrass	8
Browntop	2
Certified white clover	1
Subterranean clover	2
Danthonia pilosa	2
Total	18

If the ash is thick and plentiful, up to 8lb. of cocksfoot an acre may be included in this mixture.

Of recent years browntop and *Lotus major* have become very popular, as they have proved of great value to the hill-country farmer of the King Country. This combination has often been described as "a great sandwich" because of its palatability as well as its productivity and thick cover.

Maintenance and Management

After the sowing and establishment of a pasture comes its maintenance, and if that is to be carried out successfully, experienced management of hill country is essential. The words "experienced management" mean much, and indicate that a man has gained knowledge and skill in care and control of pastures, management of stock, fencing, care of dead stock, conducting farm financial transactions, and arranging the daily work.

Run cattle are essential to control roughage, chiefly fern and piripiri (or bidi-bidi). It is usually necessary to carry 1 cattle beast to every 4 acres as well as the sheep.

Though topdressing is comparatively new in hill-country pasture management, it is very important, as piripiri, fern, manuka, and other secondary growth, which are most difficult to control effectively by grazing management alone, easily succumb when topdressing follows good grazing management. Probably more of this high country would be topdressed if costs of haulage and application were lower, and investigation of the possibility of using aircraft for this work may eventually provide a solution.

Steam-operated Bulk and Mother Culture Starter Apparatus

STEAM-OPERATED bulk and mother culture starter apparatus has been designed by L. J. F. Jones, Dairy Instructor, Hawera, with a view to providing a simple, inexpensive means of efficiently controlling single-strain starters used in the manufacture of cheese, and the successful results achieved to date at factories where installations have been made are most encouraging.

The mother culture outfit is for preparing sufficient starter in one-litre flasks for inoculating the milk in the cans from day to day. This starter is added to the milk in the vats to develop the required amount of lactic acid for the production of good-quality cheddar cheese.

The principle of the mother culture system is to make use of live steam for preventing bacteriophage from gaining access to the milk in the flasks during the process of cooling and inoculation, and is obtained by keeping a flow of steam around the mouth of the flasks during this operation.

Bacteriophage is an invisible virus which attacks and quickly devours the lactic acid bacteria.

The bulk apparatus is for preventing bacteriophage from gaining access to the starter containers during the process of cooling and inoculation. The principle of the system is to sterilise sufficient air in an insulated cylinder containing ½in. copper coil through which live steam circulates, and while the milk is cooling this sterile air is drawn into the containers through pipes and tube connections by the partial vacuum that is being formed during this cooling process.

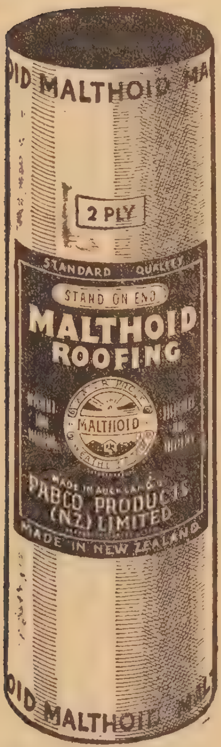
An attachment to the funnel in the starter container lid converges steam over the aperture, which prevents bacteriophage from gaining access to the milk while inoculating. The steam is turned on the converger before removing the sealing plug and reinserted after inoculation.

An alternative method is to admit steam into the starter containers or cans, thus permitting a flow of steam through these containers, above the cheese starter, and out through the inoculating aperture to drive out air and prevent bacteriophage from entering the containers from the outer air and while cooling proceeds.

When inoculating, the starter culture is poured in through the aperture against an outward flow of steam; a sealing plug is then inserted in the aperture and the steam supply to the starter containers is shut off, the cocks on the sterile air connections being left open to allow the inflow of sterile air from the steriliser to prevent a partial vacuum being formed. The filter and the air supply are continuously sterilised by the steam coil, thus permitting only sterilised air to enter the starter containers.

Famous for PROTECTION
in ALL WEATHERS!

These two famous products, MALTHOID ROOFING and HYDROSEAL, will give your buildings year round protection in all weathers. They're weatherproof, waterproof and durable. Check up on the condition of your buildings NOW—it will save you money in the long run.


MALTHOID
2 PLY
STANDARD QUALITY
STAND ON END
MALTHOID
ROOFING
MALTHOID
MADE IN AUCKLAND BY
PABCO PRODUCTS
(N.Z.) LIMITED
MADE IN NEW ZEALAND
MALTHOID

MALTHOID Roofing

As a roofing it is famous throughout the world.. Gives unequalled protection against the most severe conditions. It is extremely durable, easily laid and adaptable to every type of construction. Use MALTHOID for all roofing jobs, for covering garages, sheds, outhouses etc. For temporary shelters or permanent construction—MALTHOID is indispensable. Keep a roll handy.

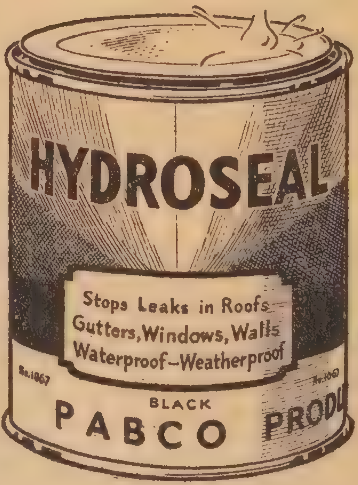
HYDROSEAL

The Leak Fixer—

For major and minor repairs, Hydroseal does a permanent job, easily and quickly. Ideal for stopping leaks in gutters, pipes, skylights, flashings, windows and frames, wall cracks, tanks etc. Available in BLACK No. 1067 for any repair that does not require to be painted over—or WHITE No. 559 for use on hot water pipes or where an oil base paintable compound is required.

Send for free literature describing the many uses for MALTHOID ROOFING and HYDROSEAL.

Manufactured by
PABCO PRODUCTS (N.Z.) LTD., AUCKLAND
Registered User in N.Z.
Sole New Zealand Distributors:
DOMINION SALES CORPORATION
Head Office: AUCKLAND, and at WELLINGTON, CHRISTCHURCH, DUNEDIN.


HYDROSEAL
Stops Leaks in Roofs
Gutters, Windows, Walls
Waterproof–Weatherproof
No.1067
No.1067
BLACK
PABCO PRODU

BUILD UP YOUR FEED RESERVES

By E. B. GLANVILLE, *Assistant Fields Superintendent, Auckland.*

AN adequate supply of silage is the best insurance a farmer can have to carry his stock over lean periods of grass growth, especially during the summer and early spring. All farmers, and particularly dairy farmers, if they have not already done so, should make immediate preparations to provide a reserve of this valuable fodder from surplus grass growth from now until Christmas. The difficult feed position experienced last season by so many, especially during the drought, should at present be foremost in the minds of all farmers, and an effort should be made to conserve all surplus grass into silage during the early period of spring growth; later growth could be made into hay for winter feed. With the need for increased primary production this season, it is most important that adequate provision of supplementary feed be made on all farms so that New Zealand can produce a maximum of butter, cheese, meat, and wool for overseas.

SILAGE making will have commenced now in some districts, but most of it will be made during November in districts where the predominant pasture species are ryegrass and clover, and where paspalum dominates the making of surplus growth into silage will not take place until December and January.

Young Herbage Best for Cutting

The best silage is made from young herbage, and cutting should take place before or up to flowering time. Silage made from young, succulent material is very nutritious, and cutting at this stage allows rapid recovery of the pasture sward with a quick second growth. When cutting is left until after the grasses have flowered the material becomes coarse and the pasture aftermath will not be so rapid in growth, while the resultant silage has a lower nutritive value. When cutting is carried out late in the season after the grasses have flowered dry climatic conditions are generally experienced, which prevent a good strong aftermath growth, while the grasses have not the same tendency to produce a further bulk of herbage once they have flowered and formed seed heads.

Unfortunately the inclination to delay the cutting of fields which have been closed for ensiling until the flowering stage is passed, mainly because many farmers desire to obtain a large bulk of green material per acre, often results in poor-quality silage which will not reach the nutritive standard required of a feed to maintain the milk supply of a dairy herd during a drought period. It is in such periods that good-quality silage is so desirable to enable milk production to be maintained while the herd is in the middle of its lactation season, and the same applies to the feed requirements of the herd during the early spring when the cows are coming into profit.

The necessity of early cutting cannot be stressed too strongly, and although it may not produce a large quantity of silage per acre, it will result in a more valuable product and also give a strong after-growth, while the pasture sward will not deteriorate as is the case with late cutting.

Process of Ensiling

The aim in making silage is to produce a food which as near as possible resembles pasture herbage. This can very easily be achieved if the process of ensiling is done systematically and a definite plan in handling the green material is carefully carried out.

When the green material is stacked fermentation takes place with consequent rise in temperature. The most nutritive silage is made at a reasonably low temperature, and therefore heat must be controlled. To prevent the temperature from getting too high it is necessary to control the air in the material, as it is the presence of oxygen in the air that induces the temperature to rise. The temperature is therefore controlled by building the stack, pit, or silo with layers of a few feet of material at intervals of at least a day, so that each layer of green material will expel the air from the layer below and prevent the temperature rising any higher, while the temperature is prevented from rising too high in the last layer of green material by covering it with a layer of earth.

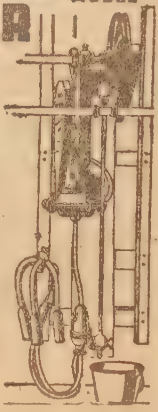
The general principle adopted to make fruity, green-yellow silage, which is the ideal fodder from herbage cut at the right stage, is to build approximately 8ft. of material during the first day, leave for one day, and then continue building about 4ft. daily until the stack is completed, which generally takes a week.

Care Necessary in Building

It is essential that the building of the material is done carefully, particularly when silage is made by the stack method. Attention should be paid to the correct placing and firming of the material at the sides of the stack, which should be kept perpendicular. Large heaps of material dumped on the stack by a grab should be broken up and properly stacked, and the centre of the stack kept slightly higher than the sides until near completion, when the centre should be hearted up with the final layer of material. Wastage in a stack can be reduced to a minimum if building is carefully and systematically carried out.

"NEW DEPARTURE" MILKER

LATEST MODEL



OUTSTANDING FEATURES

No noisy vacuum pump. No releaser, pulsators, air piping or vacuum tank. No metal wearing parts. Ingenious pulsating claw with automatic cut off and vacuum release for power economy. Milks out fast, leaving no hand-stripping. Washes itself without dismantling any part. Remarkably simplified milking system. Open Bucket or Overhead milk delivery at will. One third h.p. motor runs 2 to 4 cow outfit easily. Absolutely silent in use. Prompt service always. Write for free booklet.

J.E.Haywood Ltd.
ANZAC AVE., Box 1435, AUCKLAND

OPOSSUM SKINS

For top market prices, consign YOUR SKINS to

OTAGO FARMERS
CO-OP. ASSN. OF N.Z. LTD.
Crawford Street, P.O. Box 417,
Dunedin

01.6

IMPORTANT ANNOUNCEMENT

DISPOSAL OF NEW ZEALAND & AUSTRALIAN LAND COMPANY'S CORRIEDALE STUD FLOCK (No. 1 N.Z.F.B.).

As the NEW ZEALAND & AUSTRALIAN LAND COMPANY have received notice from the New Zealand Government of their intention to take over the "Moeraki Estate" for servicemen settlement, they have instructed the NATIONAL MORTGAGE AND AGENCY COMPANY OF NEW ZEALAND LIMITED, in conjuction with DALGETY AND COMPANY LIMITED, to hold a complete Dispersal Sale of their well-known Corriedale Stud Flock at the Burnside Saleyards in Dunedin, at a date to be arranged in February 1947.

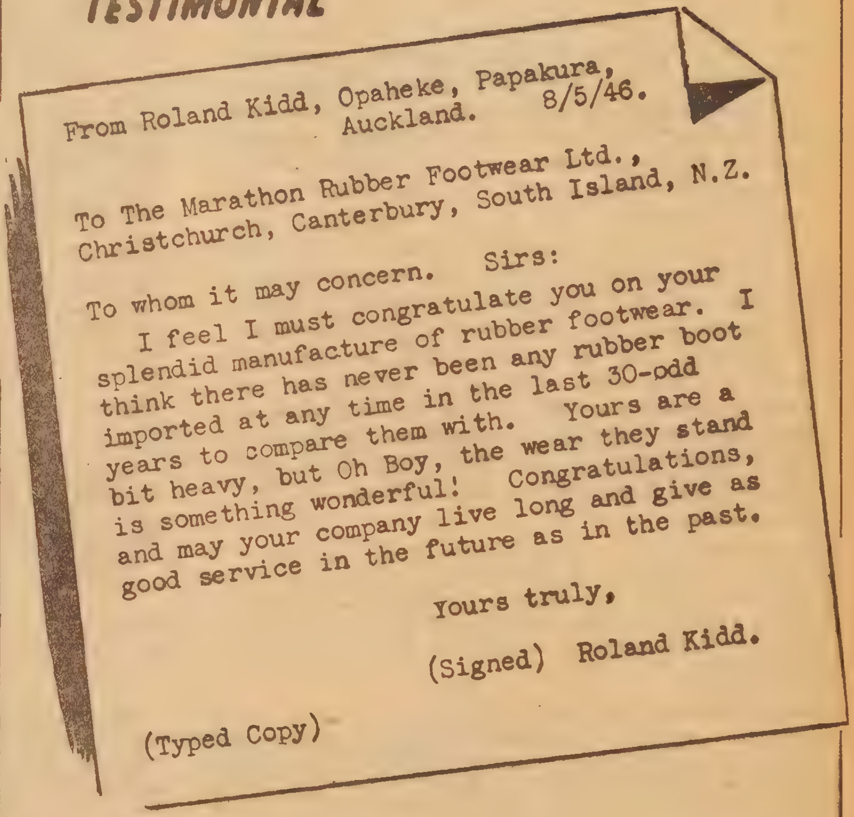
This flock was established in 1874, and is the oldest Corriedale Stud Flock in existence, being No. 1 Flock in the Corriedale Flock Book of New Zealand.

The Sale will include approximately 1,000 stud sheep of all ages and sexes, including a Show Team and Flock Rams.

Full details will be advertised later.

NATIONAL MORTGAGE AND AGENCY COMPANY OF NEW ZEALAND LIMITED.
DALGETY AND COMPANY LIMITED.

HERE'S AN ENTIRELY UNSOLICITED TESTIMONIAL



From Roland Kidd, Opaheke, Papakura,
Auckland. 8/5/46.

To The Marathon Rubber Footwear Ltd.,
Christchurch, Canterbury, South Island, N.Z.

To whom it may concern. Sirs:

I feel I must congratulate you on your splendid manufacture of rubber footwear. I think there has never been any rubber boot imported at any time in the last 30-odd years to compare them with. Yours are a bit heavy, but Oh Boy, the wear they stand is something wonderful! Congratulations, and may your company live long and give as good service in the future as in the past.

Yours truly,

(Signed) Roland Kidd.

(Typed Copy)

"OH BOY! the wear they stand is something wonderful"

Writes Mr. Roland Kidd, of Opaheke, Papakura, Auckland, in an entirely unsolicited testimonial.

MARATHON
Gumboots

A Product of
MARATHON RUBBER FOOTWEAR LTD.,
Woolston, Christchurch, N.Z.

Blossom Time

OCTOBER is the best month of the whole year for travelling, I think. Though I have often made journeys in the height of summer, and have seen the countryside in all the glory of its autumn colours, and more than once have braved the storms and bitter snows of winter to reach some particular destination, yet late spring with its blue skies and white petals of cloud, its capricious sunlight and tenuous green of growing things, is my favourite holiday time. This October I had the opportunity to pay a flying visit to Nelson. The dreaming gardens and Old-World charm of the city laid their healing spell on me, and during my stay I was fortunate enough to see something of the surrounding regions also.

Our route lay past the port with its breakwater formed by a natural boulder bank, along the main highway to the smooth sands of Tahuna at the head of the bay, thence through the outlying districts of Stoke and Richmond with their neat bungalows and gracious old homesteads whose twin gables, edged with the lacy woodwork of a bygone fashion, rise from a mist of trees—rosy-streaked magnolias, tall poplars, spires of purple lilac, jade-leafed willows, venerable and picturesque as those in the ancient legend which a potter immortalised through the medium of willow-pattern china. I was greatly interested in an up-to-date pea-viner which had been erected to deal with the large areas of crops we passed. What a pity a smaller model could not be evolved for domestic use. Just think how helpful such a machine would be in the kitchen garden: All you would have to do would be to pick the peas and put them in at one end, and they would come out ready shelled at the other.

The Waimea Plains, with their vast pastures and busily-cropping sheep, their banks of bluebells and hawthorn hedges bursting into a foam of creamy blossom, had a similarity to the rural scenery in parts of England. Much as I admire the efficiency of modern tractors, I felt a thrill of pleasure to see a team of horses ploughing. The powerful lines of those gleaming flanks and their patient heads looked so much at home against that rolling landscape. Winding across the plains was a tranquil green river famous for its fishing. Rumour has it that the angler in these parts always knows the weight of his trout before he catches it, the water being so clear that he can see the scales on its back! I also heard tales of a wily grandfather trout which has successfully eluded all attempts at capture and is of such gargantuan proportions that it has to go down to the mouth of the river and manoeuvre out to sea if it wants to turn round!

Now the road starts to wind upward through the apple lands. Much of the soil here is comparatively poor, but apples grown in this locality are heavier than those from more fertile areas. Occasionally we saw slopes newly ploughed and ready for planting; the furrows were light grey, and the clear afternoon light gave the topmost ridges a thin patina of silver. There were orchards on either side of the highway, row on row of blossoming trees opening out in a graceful stylised pattern like the delicate ribs of a fan. Sometimes the orchard boundaries would be formed by bushes of boysenberries (their fruit is a delicious blend of blackberry and raspberry), and here and there the pink-and-white prettiness of the apple trees was interspersed with groups of pears, the pale greenish flower-clusters hovering like butterflies on the slender boughs.

The names of the roads hereabouts rather intrigued me. I knew that Wellington had a link with Haworth Parsonage in that the first copy of "Jane Eyre" to reach New Zealand was sent out by the author to a dressmaker in the capital city, but I had not expected to find a Bronte Road in this remote spot. Yet another connection with the Old Country was a signpost a little further on indicating Trafalgar Road; I wondered if it had been named by some early pioneer whose forbears had taken part in that famous naval victory. There were no feathery palms or desert wastes, however, to impart an eastern touch to the typical New Zealand scenery of Nile Road—only a few stray apple trees, insignia of the orchardist, among the thickets of yellow gorse and broom.

I noted a very efficient-looking Scout troop parading in the school grounds as we passed through the little township of Mapua, and at the top of the Moutere Bluff we halted to admire the native bush on the steep cliffs leading down to the waters of Ruby Bay. Ascending once more, we had entrancing glimpses of D'Urville Island, French Pass, and the blue hills of Nelson in the distance. High up on the Bluffs a soft mist began to fall and the apple blossoms seemed even more beautiful, if that were possible, when viewed through the slanting silver curtain of the rain. Presently the sun came out again and the "tight little pink buds began to lose a little of their colour in the heat, became more luminous, turned to a more transparent gauze, then crinkled right up to their golden hearts." Perhaps the bridal effect of the trees veiled in filmy blossom was the reason for one of the by-roads being christened Marriages Road. To the passing observer, at least, its beckoning curves and secluded banks appeared an ideal setting for a lovers' walk, and certainly the scenery was romantic enough to awaken a touch of sentiment in all but the most hardened cynic.

fitting shoes for smart feet

The smartest shoes are wearing this label—and they're **good** shoes, too . . . designed on scientific lasts to give you real walking comfort, built to look well and wear well, from selected quality leathers meticulously finished in every detail. Be fitted well in Friendly Fits at any of the leading shoe stores. More are becoming available, so ask first for

FRIENDLY FIT

FINE SHOES FOR MEN

DISTRIBUTED THROUGHOUT NEW ZEALAND BY SARGOOD, SON & EWEN LTD.

The lack of traffic was rather surprising to a person used to more populous areas, and even when we passed a place where sawmilling operations had obviously been in recent progress, judging by the resinous smell of the sawdust and the piles of gleaming planks stacked wigwam fashion, there was no sign of life. Plantations of pines, their branching candelabra gilded by the sun, were almost as much a feature of these hills as the fruit trees. When we reached Tasman Bay the landscape suddenly seemed familiar, though I knew I had never been there before. All at once I realised that this quiet inlet with its serried rows of conifers and peaceful cloud archipelagos reflected in the calm water was typical of the colourful pictures of the Canadian lakes which used to be so much the vogue on calendars. The scene before me needed only an Indian maiden paddling a canoe to complete the illusion. As we skirted that lonely reed-fringed shore we could see the dehydration factory and the Motueka wharf, both many miles distant, but I gave them only a passing glance, for my attention was centred on an unusual vista—storm clouds massing and breaking over a segment of the hill range ahead, resulting in a combination of white, black, and grey tones such as Chinese artists often use in their paintings; meanwhile, the other peaks shone grape-blue in the sunlight.

Presently we began to see evidence of the other two main crops of the district—poles strung in readiness to support the growth of the hop vines, and tender young tobacco plants carefully protected from the vagaries of the weather. The entrance to Motueka is bounded by a fine airport, and we viewed the new district high school and the attractions of the town before arriving at the lovely home where we were to have tea. Here lilacs drenched the air with heady sweetness, tulips flashed their rainbow hues beneath exotic shrubs, and the velvety green of the grass was girdled with jewels—pearl and garnet and amber polyanthus, pansies purple as amethysts, small sapphire forget-me-nots, ruby-tipped daisies, carnations the colour of red carnelians. Most magnificent sight of all was a gigantic oak, the second largest in New Zealand. It had been planted nearly one hundred years ago (the first settlers landed in Motueka early in the eighteen-forties) and its trunk and majestic branches towered high above the tall gables of the house.

Adjoining the garden were sheltered paddocks where brown ducks roamed at will, a solitary turkey strutted among a flock of fowls, and a Shetland pony grazed under the apple trees. In an enclosure two stately camellia trees displayed a rain of rosy petals, and peering wistfully through the railings was a tiny lamb, so frail-looking and unsteady on its feet that it reminded me of the orphaned pet belonging to a friend of mine. Having decided to give it a bath she achieved a suitably foamy lather and went to work on the lamb with a will. The animal apparently relished the taste of soap suds and imbibed so freely of them that when lifted out of the tub it was unable to stand upright, and quite a while elapsed before it regained its equilibrium.

The lengthening shadows reminded me that I must leave these idyllic surroundings if I wished to make the 32-mile trip back to Nelson in daylight. The hour I spent in this beautiful garden and the drive through the apple lands in blossom time when

> *"Spring with all her merry train . . .*
> *Kissed the branches and they glow*
> *Rose-pink, and red, and flecked with*
> *snow,"*

will be a treasured memory.

Mary

PRESERVING TOMATOES for WINTER USE

By
EVA TOPPING,
Rural Sociologist,
Auckland.

Left—Wash the jars in hot, soapy water, scald, and invert to drain on a clean cloth. Put the self-sealing caps into bowl and pour boiling water over them, leaving in water to cool.

PRESERVING TOMATOES FOR WINTER USE

Scald the tomatoes and plunge into cold water, peel, cut into quarters, remove the core, and pack into the jars.

FROM the health point of view, one of the most valuable products of our gardens is the tomato. It provides a considerable amount of vitamin A, which promotes growth and good health; is a reliable source of vitamin C, which is essential for healthy tissues and teeth, and has a smaller proportion of vitamin B, which is also needed for normal growth and aids the digestion. In fact the tomato gives good measure of the vitamins found in fruits and vegetables, and few others provide such an acceptable combination of vitamins A and C.

We should make great use of tomatoes during their season by serving them frequently in many ways; raw for salads, garnishes, and for the children's school lunches, and cooked in a variety of dishes. For winter use they may be preserved by several different methods; whole for salads or as a vegetable to accompany meat or the breakfast bacon; quartered or pulped for soups, stews, moulds, and made-up dishes, and as juice for appetisers or drinks for school lunches.

Estimating Quantity to Preserve

The tomato season lasts for about three months of the year, leaving about 40 weeks without the fresh product, and as tomatoes are so valuable as a foodstuff, the aim should be to preserve a sufficient quantity to allow them to be served frequently during the off season.

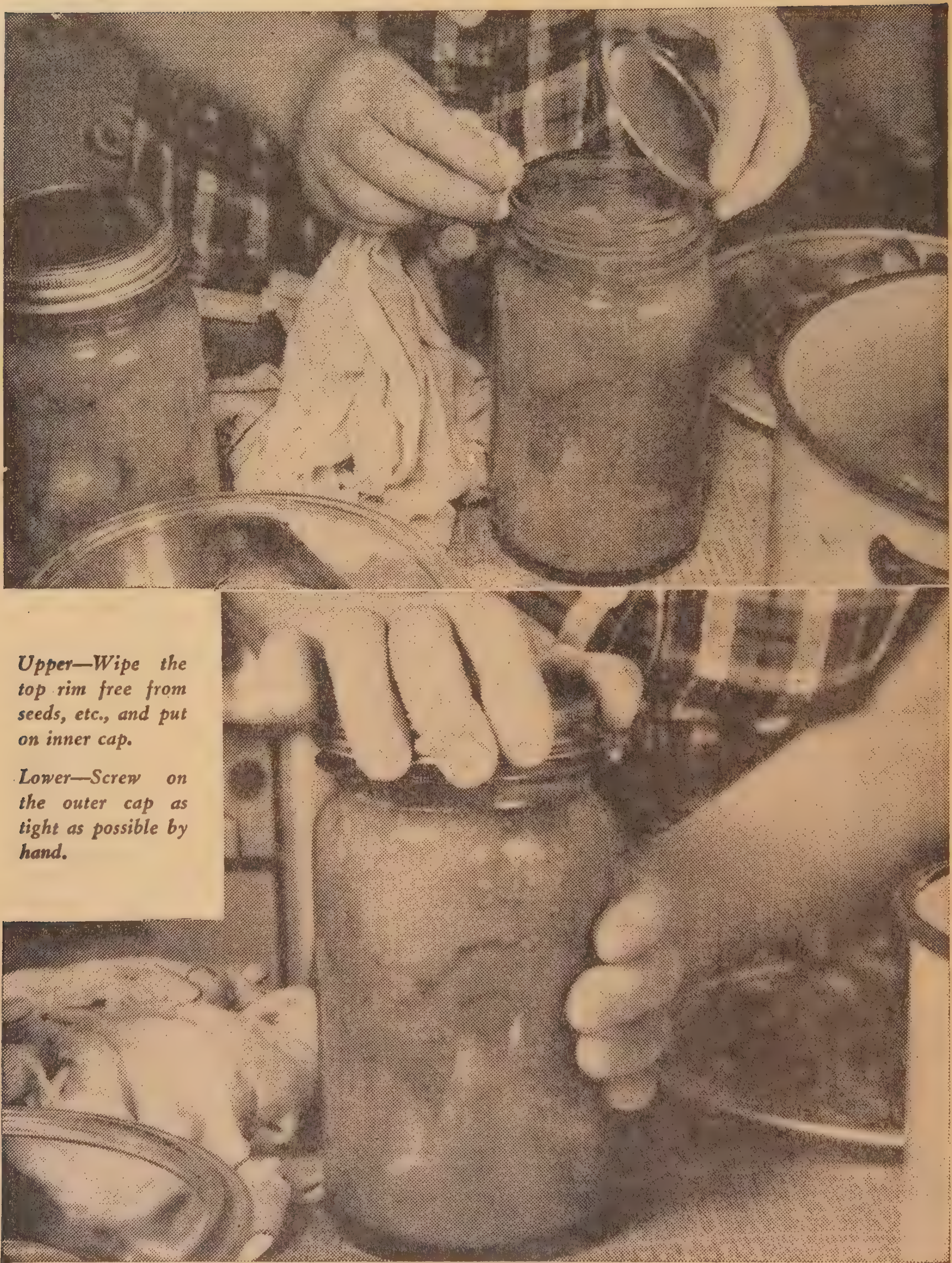
A quart jar holds from eight to ten whole tomatoes (roughly 2½lb.), and will yield enough for four or five helpings if used as an extra vegetable for lunch or dinner or with bacon for breakfast. Thus, to serve them at one meal a week during the "tomatoless" period, a store equivalent to nine or ten quarts for each member of the household is needed.

Similarly, a quart of juice provides sufficient for ten servings of half a cup or eight quarter-pints for the school lunch bottle, so to serve tomato juice once a week, a stock of four or five quarts is required.

Halved or quartered tomatoes, bottled in their own juice, yield much more from the jar, so that the amount required is less, roughly six quarts per head.

Soup gives from five to six portions from each quart jar, more if it is diluted with milk or soup stock when being prepared for the table, so allow six jars for each person.

A stock of 26 to 28 quart jars, or their equivalent in other-sized containers for each member of the household, would give four servings of tomatoes in one form or another each week while no fresh ones are obtainable. The requirements can be worked out to suit individual families from these estimates.



Upper—Wipe the top rim free from seeds, etc., and put on inner cap.

Lower—Screw on the outer cap as tight as possible by hand.

Plunge into hot water bath, place packing between the jars (newspaper will serve the purpose). Put the lid on the water bath and process for 35 minutes after the surrounding water boils again.

Preparing Equipment for Preserving

Collect the jars and look them over carefully, discarding any that are cracked or have chips and rough edges to the top rim, as the uneven surface will prevent a good seal being made.

Gather the lids together and sort into the various kinds, as they will need different methods of preparation. The older types of screw caps used with rubber rings must be sterilised by boiling for 10 minutes, leaving them in the water until ready to use. Rubber rings should be boiled gently for 10 minutes and left in the water. The inner caps of the self-seal type need to be put into a vessel and boiling water poured over them—the outer screw cap only needs washing.

Wash all jars in warm, soapy water, scald with boiling water and invert on a clean kitchen cloth to drain until ready to use. Choose a vessel which will be deep enough to hold sufficient water to cover the jars well—a deep saucepan, cut-down kerosene tin, billy, bucket, or the washing boiler. A false bottom will be needed to keep the jars from contact with too fierce heat. A cake cooler will often serve, wooden slats nailed together in trellis fashion, straw or hay, folded cloths, or thick folds of newspaper. Extra packing will have to be put round the jars to keep them from knocking against each other or the sides of the vessel.

Bottling Whole Tomatoes in Water

The selection of the fruit for bottling whole needs care; smooth sound tomatoes, just under ripe (that is, firm but well-coloured) will give the best results. The sooner the preserving is done after gathering the better in flavour and keeping quality, and the more healthful will be the finished product. The aim should be to have the tomatoes processed and set to cool within two to two-and-a-half hours of being picked from the plants.

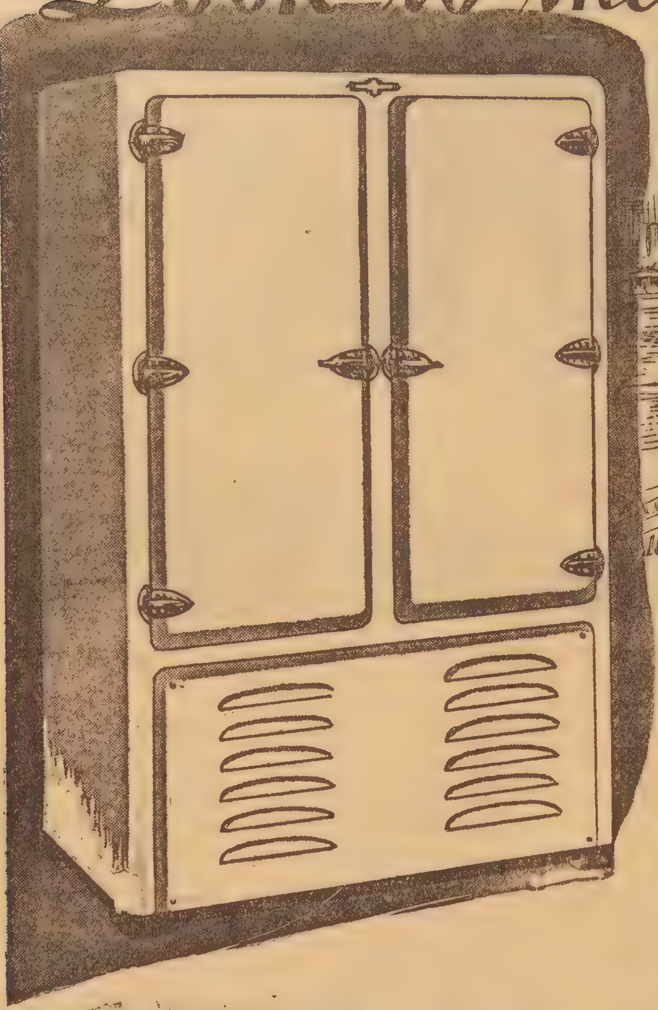
Being acid, they are easily preserved by simple methods; the cold or hot pack followed by processing in water bath or oven is most satisfactory.

Choose the fruit and wash to remove traces of spray, soil, and dust. Take off the stalks; if preferred skinned, put in the colander or a muslin bag (a clean, well-washed bacon or flour bag will do) and dip into boiling water for one minute, remove and cool immediately in cold water, and the skins will then peel off easily. If the tomatoes are not peeled, the skins should be pricked all over with a darning needle to minimise bursting during processing.

Put water bath on to begin heating.

Pack fruit evenly and firmly into the washed and scalded jars, filling to within ½in. of the top, making as tight a pack as possible without bursting the tomatoes, as they will shrink in cooking. Add one teaspoonful of salt to each quart jar. Fill with hot water to the top if used with screw caps and rubber

Look to the favourite—



FRIGIDAIRE'S all steel cabinet, trouble free mechanism and variable temperature control, mean refrigeration that is safe, simple to operate *and* dependable.

ENGINEERED in New Zealand to suit New Zealand conditions your FRIGIDAIRE soon pays for itself by saving waste.

Look to FRIGIDAIRE

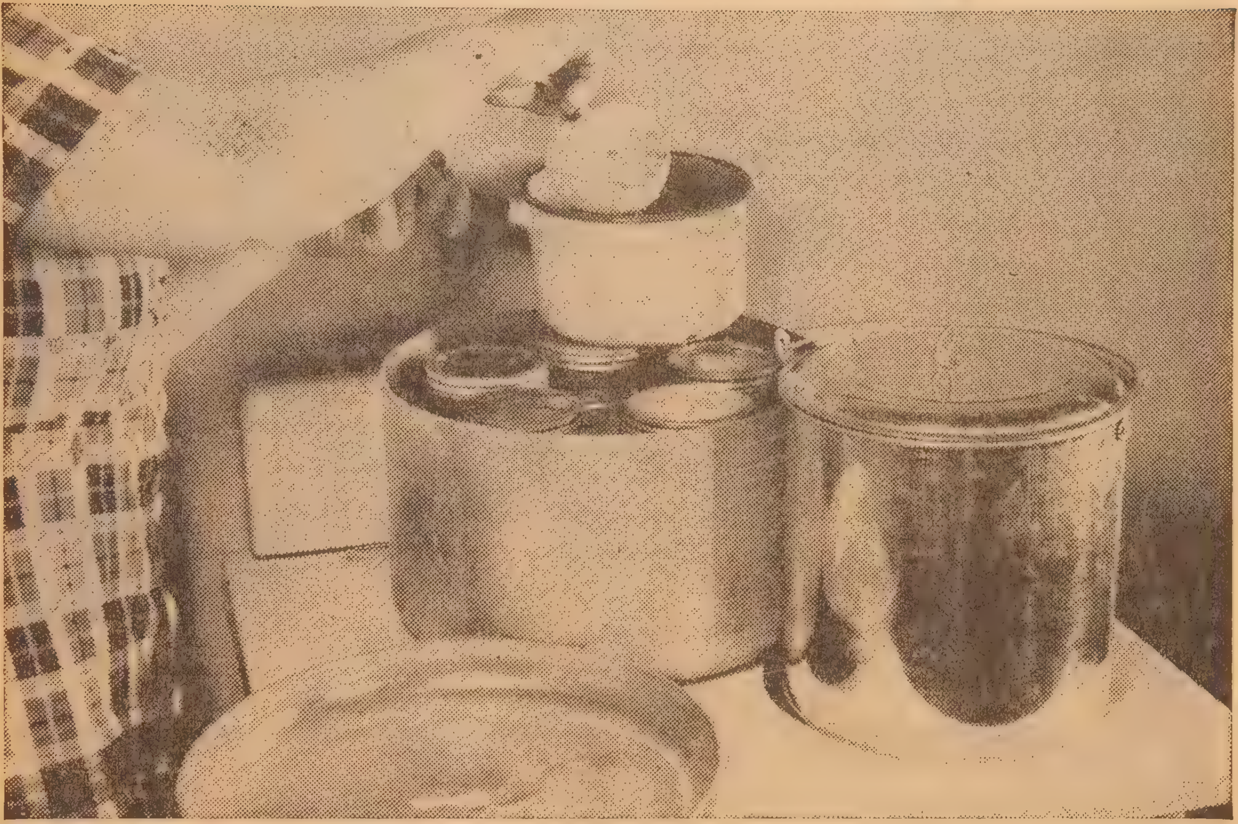
DIVISION OF GENERAL MOTORS NEW ZEALAND LIMITED

FRIGIDAIRE, NEW ZEALAND
PETONE.

Please forward me particulars of FRIGIDAIRE HOUSEHOLD MODELS by return mail.

NAME ....

ADDRESS ....



Take out some of the boiling water, so that the jars can be grasped easily, and remove one at a time.

rings, and within ½in. if with self-sealing lids. Adjust tops according to type of jar used.

Immerse in prepared water bath, making sure the jars are covered and the water circulates freely round each one, and process for 35 minutes *from the time the water bath boils* again after putting in the jars.

Draw water bath away from heat—take out some of the water with a cup or jug and lift out one jar at a time so that it can be sealed immediately it is removed.

Seal according to type of jar used and set to cool without disturbing.

Test jars for good seal after standing for 24 hours.

Store in cool, dry cupboard away from the light.

Whole Tomatoes in Extra Tomato Juice

Pack whole tomatoes in jars as already described.

Take broken-skinned, over-large, very ripe, misshapen, or undersized tomatoes, cut roughly, and put to stew in a covered saucepan. Stir occasionally to prevent the pulp sticking to the pan and burning, and cook until very soft.

Strain to remove skins, hard cores, and some of the seeds, and use the juice to cover the whole tomatoes instead of water. Allow 1 teaspoon of salt to a quart jar and 1 to 2 teaspoons of sugar if liked.

Immerse in hot water bath and process for 35 minutes after water boils. Remove jars one by one and seal.

Tomatoes Preserved in Own Juice (illustrated)

More tomatoes can be packed into the jars by using this method, and broken-skinned or very ripe fruit can be utilised. It is better to peel the tomatoes, as separation of skin and pulp occurs during processing, and the large pieces of skin are unattractive and coarse.

Cut tomatoes in quarters and pack tightly into the jars.

Use 1 teaspoon salt to each quart jar, sprinkling it in when the jar is one-third, two-thirds, and quite full. The flavour is improved by the addition of 1 to 2 teaspoons sugar to each 2lb. fruit. Add no water, but press down well so that the tomatoes are covered in juice, adding extra from other cut and pressed tomatoes if necessary.

Adjust caps and process for 35 minutes after water bath boils.

Remove some of the water so that you can grasp the jars and take out one at a time. Stand on wooden table or board to cool. If caps and rubber rings are used, tighten caps as the jars cool and do not take out several jars at a time, as each one must be finished off as quickly as possible while still hot. If using self-sealing jars, do not tighten the screw band after processing or the seal will be broken.

Store in a cool dark place, as light destroys the colour and vitamin C.

PRESERVING TOMATOES FOR WINTER USE

Set the jars on a folded cloth and leave undisturbed to cool. Label and include the date of processing so that the ones which were done first can be used first.

Tomato Puree

Small, uneven, or broken-skinned tomatoes may be used.

Heat in covered pan with very little water until soft and stir occasionally. Add salt, one teaspoon to one quart, and a little sugar if liked.

Strain the pulp through a colander, return to pan, and bring to boil.

Pour into warm, sterilised jars, adjust caps, and process in water bath for 10 minutes.

Seal, cool, and store.

Tomato Juice

Wash, peel, and drain sound, ripe tomatoes. Use the very large ones that are too big for bottling, and broken or uneven fruit. Do not use any green portions, as they give a bitter, unpleasant flavour.

Cut in pieces and simmer in covered vessel until very soft, stirring now and then. Do not boil, and use no water.

Strain through fine sieve to remove seeds, skins, and cores.

Bring the strained juice to boiling point, add salt (1 teaspoon to 1 quart), and pour at once into hot, sterilised lemonade bottles; fill to top and process for five minutes in water bath.

Adjust crown seals or insert corks and dip immediately in melted wax to make an airtight seal.

If jars are used, sterilise first, fill with hot juice, and process five minutes as for bottles.

Adjust seals, cool, and store in dry cupboard.

Make the whole process as rapid as possible to retain the flavour and the maximum amount of vitamin C. Tomato juice has about half the value of fresh orange juice.

TOMATO SOUP

7lb. tomatoes	3 tablespoons flour
2 onions	3 tablespoons butter
2 stalks celery	$\frac{1}{4}$ teaspoon pepper
3 teaspoons salt	Spring of thyme
3 teaspoons sugar	7 sprigs of parsley

Wash tomatoes, celery, parsley, and thyme. Cut celery and tomatoes roughly, add sliced onions, and cook gently until very soft. Strain through colander and return to pan. Rub butter into flour and mix to smooth paste with tomato juice. Pour into boiling soup, stirring well to prevent burning. Add sugar, salt, and pepper, and strain again if necessary. Fill sterilised jars, adjust caps, and process in water bath for 15 minutes.

This soup is very well flavoured and much more appetising than the commercial tinned product.

Photographs by Sparrow Industrial Pictures, Ltd.

COLOUR IN THE HOME

By NORMA K. METSON, *Rural Sociologist, Wellington.*

"BLUE is not a colour, it is a mystery," said an ancient sage. All cultures have used colours symbolically: They have their colours of mourning and of joy, of royalty and of ostracism. These traditional associations influence reactions to colours, and so do more personal factors. For example people generally prefer the colours which suit them to those which do not. Because they have this power of affecting the emotions, and because they are the most obvious ingredient of most decorative schemes, colours should be chosen with care. They can make rooms appear small or large, warm or cool, restful or stimulating, and the use of good, clear colours with carefully-planned accents to attract the eye will make otherwise commonplace rooms things of beauty.

PRINTED slip covers or curtains in gay colours will transform a living room which has become a little dull and drab. A small bedroom will look much bigger and brighter if the dark stain is stripped from its old furniture and replaced by enamel in cream or a pastel shade. The young home-maker will find that colour, more than anything else, makes sparsely-furnished rooms homelike and attractive. Woodwork which may vary from the silvery black of walnut to palest shades of bleached oak or unstained beech, metal fittings on windows and lights, the materials of hearth and fireplace, pictures and ornaments—all contribute to the total effect of a room, in addition to furnishings which are chosen principally for the colours they contain.

ANSO

ANTISEPTIC and DISINFECTANT

No first-aid preparation affords a wider usefulness on the farm or in the home.

A leading surgeon writes—"I would like to say that I have been using Anso for some 6 months now and find it very satisfactory both for surgery and household use; in fact in the surgery I use nothing else."

ANSO softens the hardest water and when used in the bath or wash basin leaves the skin like velvet.

RESTAR (S.I.) LTD.

Manufacturers, Christchurch.
WHOLESALE DISTRIBUTORS:
CORY-WRIGHT & SALMON LTD.

Wesley College, Paerata.

A Boarding School for Boys (Form I to VI), under the control of the Methodist Church of New Zealand.

Set in attractive surroundings, with swimming-baths, extensive playing-fields, modern buildings.

Special attention given to Physical Education, Clubs, Carpentry, Crafts, and Music.

A full General Course for Junior Forms. Specialist training for Seniors in one of the following:

Academic and Professional subjects.
Agricultural or Animal Husbandry.
Woodwork.
Commercial and Accountancy subjects.

The College has a large mixed farm attached. A certain number of Farm Cadetships are available for Form V boys at slightly reduced fees.

Applications for enrolment should be made to

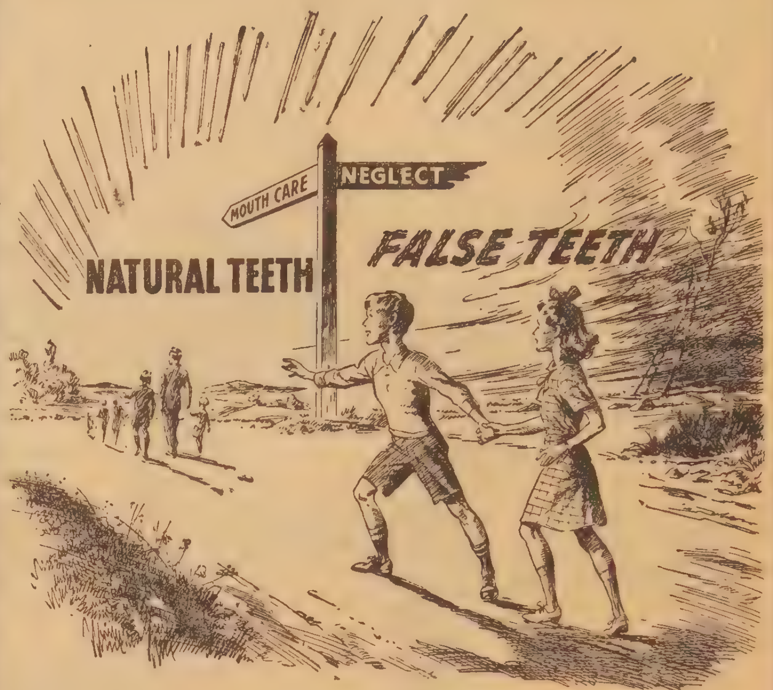
THE PRINCIPAL,
Wesley College, Paerata, Auckland.

Decay fungi under your house is as damaging as borer. Pentachlorphenol, as applied by Boracure, will kill fungi and other micro-organisms as well as all wood-destroying insects. An inspection places you under no obligation. 4.6

217 Lambton Quay, Wellington.
Phone 40-050
Branches throughout the Country.

BORACURE (N.Z.) LTD.

ISSUED BY THE DEPT. OF HEALTH



TAKE THE RIGHT ROAD

Nature meant us to retain our own teeth throughout life. Natural teeth are best because with them:

- We eat better
- We digest our food better
- We look better
- We talk and sing better.

No artificial teeth can replace the radiance and sparkle of healthy, natural teeth and gums.

False teeth are never as good as our own. They cannot manage as efficiently those juicy steaks and chops, that crusty bread, and those stimulating fibrous foods.

Wearers of false teeth show their age more quickly—lines appear round mouth and nose. Gums often shrink fast, causing loose fit and requiring frequent replacement of dentures.

Young men and women, keep your natural teeth clean and sparkling by: Brushing your teeth after meals, particularly before bed. End each meal with a salivary stimulant and tooth cleaner such as raw fruit or raw vegetable. Visit your dentist twice a year.

KEEP THIS ANNOUNCEMENT FOR FUTURE REFERENCE 3c

FOR A HEALTHIER NATION

Advice from Nature

If you have difficulty in deciding on colours to use, look hard at the endless range of natural colours. Observe the subtle variations in green on a bush hillside, the difference between the greens of native and exotic trees, the blendings of red and green in a ripe apple, the way a sunset spreads across a blue sky, and how charming a mixed bowl can be made up from flowers and leaves of the most diverse hues. Paradoxically, Nature provides the most "artistic" colour combinations, and even with all our wonderfully-compounded dyes exact reproduction is not always possible. But there is certainly no dearth of suggestion.

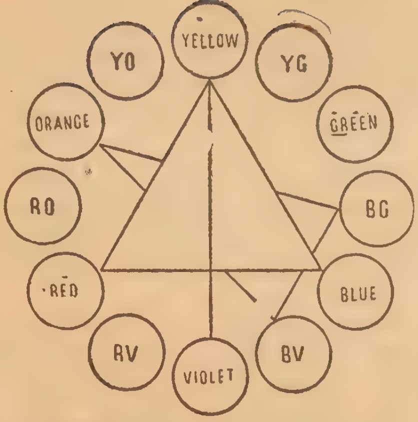
There are many different ways of working out colour schemes. One of the simplest is to take an attractively-coloured printed material which you wish to use in the room—for curtains, bedspreads, or loose covers perhaps—and make this your guide, choosing from the colours in the pattern those which you wish to emphasise and to use in large or small amounts. For example, from a linen with an off-white background, and a conventional flower pattern of dusky pink, wine, blue, and green might be planned a bedroom with walls of the background off-white tint and plain flooring of the wine colour. The print would be used for curtains and bedspreads; blue for a chair, stool top, and dressing table mats; and dusky pink for the shade of the bedside lamp.

This method may be followed with a ready-made colour scheme from the carpet, linoleum, wallpaper, or pictures; but the proportions in which the colours are used are as important as the colours themselves. If, for example, blue appears only as an accent in the guide, it should not be allowed to dominate the furnishings.

Colour Theory

In the absence of such a definite plan you may like to experiment a little and work out a scheme from "theory." Colour theory begins with the three primary colours, red, blue, and yellow. From these a complete range of hues can be mixed on the principles learnt with one's first paintbox. Blue and red make violet, red and yellow make orange, yellow and blue make green, and varying the proportions will produce an infinite range of lovely hues, shading gradually into each other.

Harmonious colour schemes can then be built by using variations of one colour—navy blue and baby blue; by using closely-related colours—the kinds of blues and reds which tend toward violet; or by using the "complementary" colours directly opposite on the colour wheel—yellow and violet for example, or reddish-orange and blue-green. This last method sounds somewhat startling, and so would the room be if the decorator used these opposite colours in equal amounts and in their most vivid forms.



This diagram of a colour wheel shows how the hues shade into each other. Colours which are directly opposite will harmonise, as will the three touched by the points of the triangles. By rotating the circle many unusual combinations may be found.

Graduation of Colours

But the rule in any colour scheme is to use only small areas of bright, vivid colours, such as pillarbox red or royal blue, and to use more subdued shades for larger areas such as floors and walls. Just as white merges into black through a series of gradually-darkening greys, so each hue can be varied from where the colour scarcely appears at all to one where it is almost black. Rooms will have a more balanced appearance if colour values proceed from dark-toned floors up to light ceilings.

One colour of the scheme must dominate and the other or others be used in smaller amounts to accent and enhance it. A living room with a complementary scheme might have a deep blue-green carpet, walls of that warm cream which has a hint of orange, a lighter shade of blue-green for curtains and some of the upholstery, a printed or striped fabric with red-orange predominating for additional chair covers, and accents of flame for cushions or a small stool.

Unity Within the House

As in the style of furnishings, unity in the colours used in different rooms gives a more restful and spacious air than a series of more or less violent contrasts. For example the walls, floors, and background woodwork may be finished in the same way in all rooms, but colours in the furnishings varied sufficiently to avoid monotony. Most people have a favourite colour which appears repeatedly in their choices, which helps to achieve unity.

If members of the family have very different tastes, the best solution usually is to allow scope for individuality in the comparative privacy of bedrooms, while selecting for the hall and living and dining rooms colours which meet with general approval. Rooms which are occupied only for short periods at a time—dining room, hall, or spare bedroom—may have more vivid and contrasting colours than the much-used living room, where more subdued effects are usually preferred.

Influence of Light and Sun

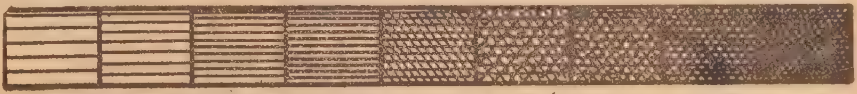
The amount of sun and light in a room will influence the choice of colours. An almost magical transformation can be wrought in a dark kitchen by painting it white or pale cream, and if accents of red or orange are used, the room will not appear cold. The cool colours are blues, greens, and yellow-greens; any colours which contain red, orange, or clear yellow will be warm, and this includes the tans, rusts, and the brown tones of most woods.

A problem bedroom which faces south can be made bright with light, natural-finished or bleached wood and sunshiny yellow fabrics; avoid greyed tones and pale colours. A very sunny living room, however, will be less oppressive on hot days if the cooler blues and greens are used in its decoration, and if a complementary scheme is used, there will be sufficient reds or oranges to prevent a chilly effect in winter.

When choosing colours try them out in artificial light as well as daylight, for they sometimes change quite considerably.

Use of Black and White

Black and white are not strictly "colours," but they can be used with very good effect in many ways and need not be limited to the draught-board linoleum so often found in old-fashioned bathrooms. Pure white sug-



White merges into black through a series of gradually-darkening greys.

COLOUR IN HOME ....

gests absolute cleanliness, and some people therefore prefer it for bathrooms and kitchens. Few would suggest an all-black room for any purpose, but the shiny black of a silk cushion, or the dull black of a pottery vase, will be distinctive in a room of lighter colours.

Do not be afraid to experiment with colour, for there is in New Zealand a real danger, pointed out by the author of a survey on furniture ("Making New Zealand, Centennial Survey No. 22"), of " . . . a way of furnishing that has been reduced to a formula: Cream walls with woodwork painted to match, dun-coloured haircord carpet, sage-green chair coverings. A variant is to be found in green haircord carpet and dun-coloured chair covers. Curtains match the walls, or are green or dun-coloured." Such rooms are very pleasant and restful in their simplicity, but a little thought can produce results which will be more interesting without being over-elaborate or disturbing.

Photograph by Sparrow Industrial Pictures Ltd.

Spring with its Magic

DON'T you love these first few weeks of spring, with the days getting just noticeably longer and the sun's rays so much stronger in the mornings? Such lovely sunny days, and yet the evenings are quite chilly enough to make a fire a pleasant thing to look forward to. It is at this time of the year that the countryside looks at its best. The paddocks are green and fresh, and the willows and poplars have new green leaves, and the kowhai down by the creek has a dress of cloth of gold.

But it is among the flowers in the garden and the fruit trees where spring really runs riot. The peach and plum blossoms make a picture of loveliness. What though the longer days bring more work, calves and lambs and chickens that all need to be looked after, and a garden crying for attention. "The winter is past and gone, and the cry of the turtle is heard in the land." Everywhere there are signs of new life and we feel an urgency to be up and doing. There are outdoor jobs to be done these sunshiny days—we snatch an hour here, a half-hour there, which is what wily old Mother Nature really intends us to do.

Spring with its magic of throbbing life is all around us. Then will follow summer with its dewy mornings, brilliant days, colourful butterflies, and purposeful bumble bees flitting among the flowers; autumn with its rich warm colouring and air of serenity; and winter wherein night draws the curtains across the sky and humans seek the comfort of a warm fire. Birds, bees, and flowers have done their work for a while and now they must rest. It is these periods of transition which provide a source of ever-recurring youth to this old world of ours, and we do well when we fall in with her mood and leave our indoor pursuits in order to get out-of-doors as much as possible that we may partake of the mental, spiritual, and physical refreshment Nature offers us.

—**"Jonathan," Clarence Bridge.**

COMPETITION

NOVEMBER: The current essay competition "Treasured Possessions" closes on November 15. First prize 10/-; second prize 5/-. Entries to "Mary," "Journal of Agriculture," Box 3004, Wellington.

Sleep is the best cure for waking troubles.

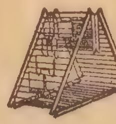
For his Lordship
THE BABY

RELAX FOLDING COT

This plunket style cot is designed for baby's comfort. It is strongly built and the deep, wide hammock is of good quality duck. It can be rolled compactly when not in use—so convenient for travelling.

RELAX FOLDING PLAY-PEN

Enables baby plenty of room to play in complete safety. The "RELAX" Play-pen is a marvel of ingenuity—it can be folded completely flat for travelling. The small illustration shows the pen folded pyramid-fashion to make a very effective clothes drier.



RELAX KIDI-SAFTI SEAT

Making motoring a pleasure for both baby and driver, the "RELAX" Kidi-Safti Seat is a motoring necessity. Strong metal brackets, rubber covered to protect upholstery, fit neatly over the front seat. When not in use the Kidi-Safti Seat can be folded and stored.

RELAX DROP-SIDE COT

An improved sliding device which cannot wear out or fail makes the "RELAX" Drop-side Cot absolutely safe. The mattress support is made of flexible battens combining comfort and strength. The cot is supplied in either plain or varnished wood —it can be packed flat in 6 minutes for transporting.

At your nearest retailers—

Manufactured by J. J. McCASKEY & SON LTD., WALTER ST., WELLINGTON.

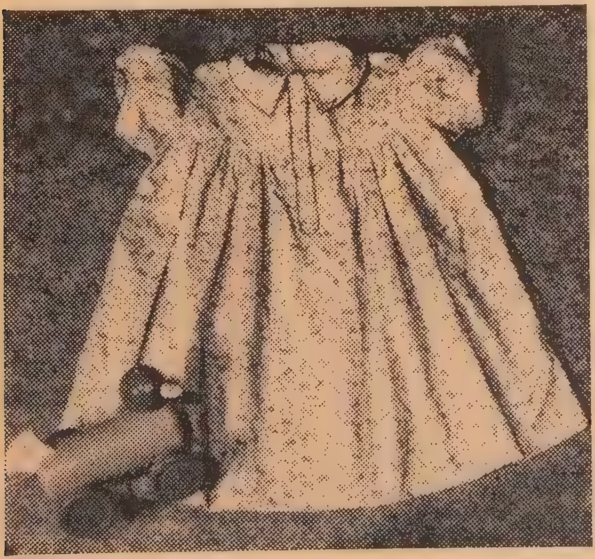
FROCKS FOR VERY YOUNG GIRLS

By **EVA TOPPING,** *Rural Sociologist, Auckland.*

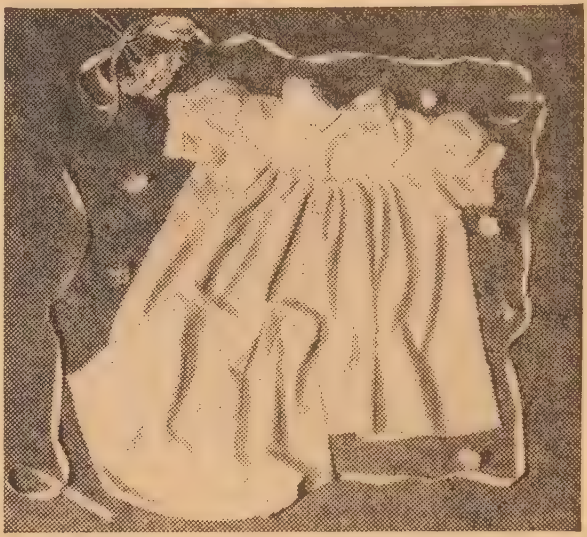
FASHION does not change much in the dress world of the littlest ones, and the charm of young children's clothing depends mainly on colour, suitable materials, good needlework and finishes, immaculate freshness, and simplicity rather than on elaborate styles. Every mother likes to see her little daughter attractively dressed, and the small frocks do not take much material or time to make at home.

MATERIALS which will wear and launder well are essential, for the little garments will pay frequent visits to the wash-tub. For the same reason good firm seams are needed, and French seams are usually most suitable. Coarse-grained, heavy fabrics are rarely suitable and should be avoided, for they hamper the free movement of small active bodies and chafe tender, childish skins. Warmth can be provided by light-weight woollen materials worn with knitted jerseys or cardigans to slip on top, or by extra woollen underwear. Plain colours, small checks and spots, plaids, narrow stripes, and sprigged patterns are better than the larger designs, which tend to make the small garments appear out of proportion.

For summer wear dimity, haircord, muslins, voile, prints, gingham, lawn, rayons, and spun silks are all suitable, while for the colder weather there are various trade-named materials especially manufactured for small children's wear—winceyettes, light-weight flannel, velveteen, and synthetic woollen goods. To cut to the best advantage, any design should run both up and down; patterns which have a definite right way up do not allow the most profitable use of the material. Velveteen must be cut carefully, with all the parts of the paper pattern set out so that the pile strokes in the same direction in wear. If the back and front are cut with the pile running in opposite directions, there will be a very noticeable difference in the shade of the two pieces. With the softer materials, panties to match the frock are very much in favour, and allowance should be made for them when calculating the amount of material required.



Patterned frock—front opening



Plain frock with embroidery and panties to match—back opening.

Simple Styles are Best

The best styles are simple, primarily because they are more becoming to the "tinies" and also because they are more easily washed and ironed. Trimmings should not be heavy or too ornate; fine tucks, small stitchings, touches of embroidery, smocking, gathering or shirring, narrow pipings, and bindings are the natural finishes for children's clothes. Where contrasting colours are used for collars and trimmings a lighter shade than the frock is usually more youthful and flattering.

When choosing the design and colour for the frock, the individual child should be considered. The energetic tomboy looks wrong in the frilly, fluffy dress which might be perfect on the "dainty fairy" type of child. The soft blue and pinkish shades which suit a fair, blue-eyed girl would probably make a dark-haired, brown-eyed lassie look sallow, whereas maize, reds, light browns, greens, or tawny colours would turn her into a "nut-brown maiden." So choose a style which will suit the child's type, and tones which emphasise her colouring.

Fastenings

Fastenings should be as simple as possible so that the little girl can be quickly and easily dressed and later can begin to learn to master the problem of dressing herself. Buttons with worked or bound buttonholes are to be preferred to button loops, snap fasteners, or hooks and eyes, for they are more readily fastened and launder better. Hooks have a nasty way of catching in the hair or in other garments, and worn ones can scratch the skin. Snap fasteners on back openings often "pop" in wear, and button loops are difficult to adjust on a fidgety child. Draw strings can often be used at neck lines and tie belts at the waist; both are quick and easy to fasten.

Fit and Measurements

Small children grow very quickly and tight clothing hampers free movement, so a too-snug fit is not desirable. At the same time the dresses must not be made too large, for that would cause the child to appear ungainly. It is surprising how early in life children become sensitive about their appearance; they do not like to appear remarkably different from their playmates, and it is cruel to force them to wear clothing in which they feel grotesque or conspicuous in any way. Room for growth can be provided by concealed tucks under hems and cuffs, which, especially if run by hand, can be quickly let out when extra length is required, leaving no tell-tale mark.

Before cutting the material study the paper pattern and diagrams given with it to make sure that the correct pieces have been selected. Check the measurements with those of the child; fewer measurements are needed than for adults, but they should be carefully taken. Essential ones are the neck, chest (which is taken round the body under the arms), waist, hip, length, round the arm where sleeve is to finish, and the length the sleeve is desired. There is often little difference between the size round the chest and the waistline, while the hip measurement is big in proportion. That is why garments hanging straight from the chest are so suitable and becoming to small children.

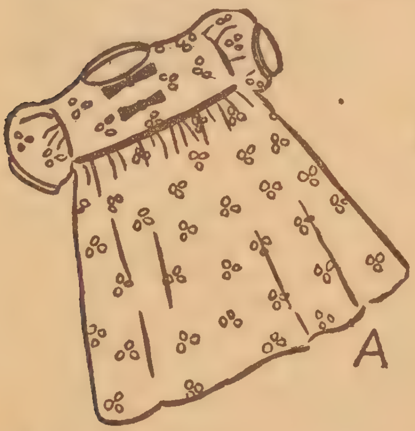
EASY-TO-MAKE YOKE STYLE

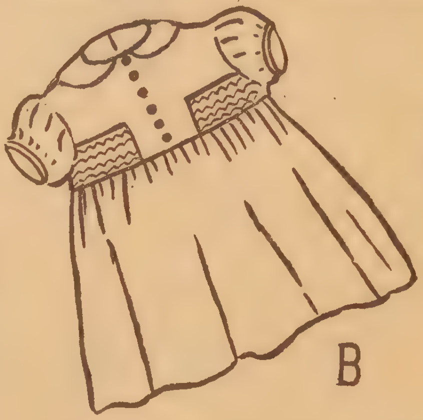
The simple yoke style is always in favour with mothers of small girls; it is easy to make, invariably becoming, economical with material, and quickly ironed. Moreover, the basic pattern can be varied to give a change of design even by those who have not much dressmaking experience or skill. Though most paper patterns have been in short supply, this ever-popular style is usually to be found, or one can be cut in paper by following the diagram on the opposite page. Being in small pieces, the pattern allows of an economical layout on new material, and short lengths found on the remnant counter or good parts of adults' discarded garments, such as tennis dresses, summer prints, light-weight woollens, fine flannel shirts, and knitwear in the lighter shades can be used.

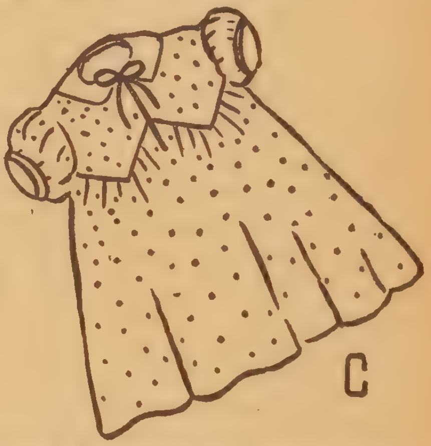
Cutting Pattern from Diagram

Ample turnings are allowed in the accompanying diagram, including a 3in. hem. With slight adjustments the frock will fit a child from 1 to 3 years of age. Each square on the diagram represents 1in. Take paper of sizes shown and make marks to correspond with the points on the diagram where the heavier pattern lines cross the

SKETCHES ILLUSTRATING VARIOUS STYLES ADAPTED FROM PLAIN YOKE PATTERN.



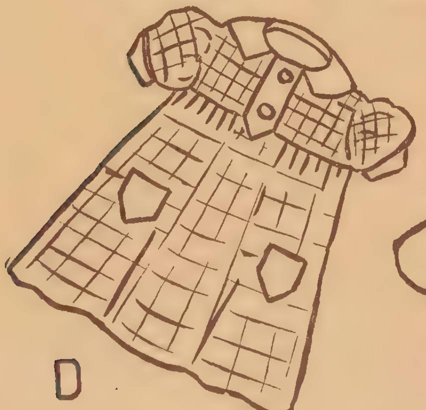


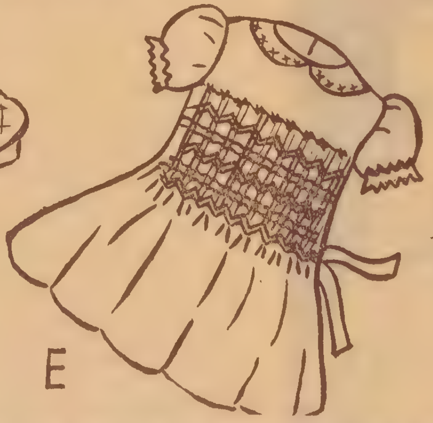


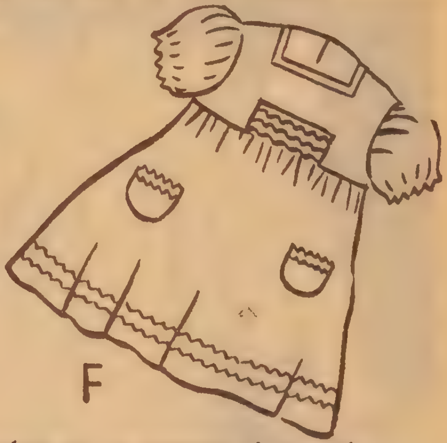
A.—Flowered material piped round neck, sleeves, and yoke with plain colour to match flowers; two tiny bows of colour on yoke; back opening.

B.—Plain material; yoke cut down deeper in front to form panel; rows of gathering either side; small buttons to trim front yoke.

C.—Spotted material; yoke cut down in two peaks; plain white collar with cord tie; front opening.





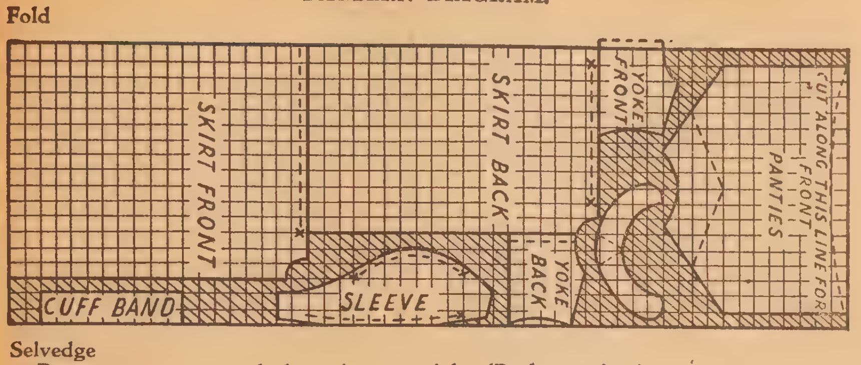


D.—Check material; front tab opening; plain collar and cuffs; pockets cut on crossway of material.

E.—Plain material; smocked in colour from yoke to waistline; tie belt inserted; knotted at back. Sleeves smocked and feather stitching at yoke and round collar and at edges of sleeves. Cut skirt front wider if necessary to allow for smocking.

F.—Plain or patterned material; yoke cut deeper at sides; square neck; trimmed rows of rick-rack braid in bright colours on neck, sleeves, hem, pockets, and in front panel of yoke; back opening.

PATTERN DIAGRAM.



Pattern set out on 1¼yds. 36in. material. (Back opening.) 1 square=1in.

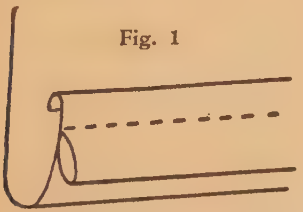
squared lines. For the skirt it will be necessary only to mark inch squares at the armholes, but for the collar, sleeves, and yokes crease the paper into inch squares.

When a back opening is required place the heavy line of the front yoke on a fold and ignore the dotted line, and cut the back yoke with turnings as shown by dotted line. For a front opening reverse these directions and cut the collar in one piece, placing the back on a fold. For a back opening cut two half-collars, using the dotted line to shape the back. Cut the yoke linings in light-weight cotton or silk, using the same pattern as for the frock. They can be made of the same material as the dress when this is suitable.

Simple Adjustments

Several inches can be added to the hem to give extra growing room. The skirt is wide enough to take a very deep hem, or a concealed tuck can be run in by hand (Fig. 1).

Fig. 1



If the sleeves are too long, the cuffs can be narrowed or the sleeves finished with a bias binding. If too short, add extra length to the pattern before cutting the material.

When a deeper yoke is wanted add extra length back and front, making the armholes in skirt parts correspondingly shallower.

PLAIN FROCK WITH EMBROIDERY

Take the yoke front piece and cut a new pattern. Mark 1in. extra at centre front fold and draw a gentle curve to the armhole as shown in Fig. 2. Place the inner edge on the fold, leaving no centre turning. Take the back yoke pattern and cut with turnings as shown by dotted line. Take the skirt front and mark 1in. down; join with the line to the armhole (Fig. 3). Cut the collar on dotted line instead of fold to give two small collars.

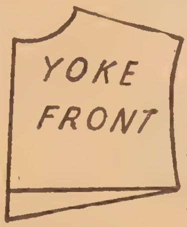


Fig. 2

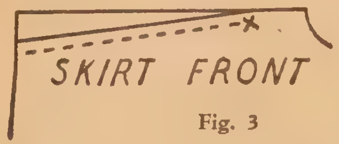


Fig. 3

The frock and panties can be cut from 1¼yds. of spun rayon 36in. wide and the yoke linings made from soft, white, cotton material.

To Make Up

Join shoulder seams of yoke, making single seams only; that is, put right sides together, stitch ¼in. from edge, open, and press flat.

Gather the front skirt and join to the front yoke, again using a single seam, but press so that both raw edges lie over the yoke.

Cut 4½in. down the centre of the back skirt for the back opening. Cut a strip of self material 12in. by 1½in. and ¾in. (Fig. 4). Pin the wide end of this facing to the right back, and the narrow to the left. Machine stitch near to edge (Fig. 5). Turn inwards and press a narrow facing on the left and a broad lap over the right. Finish with hand hemming and back stitching at the folded end (Fig. 6). Trim off the ends level with the top of the skirt.

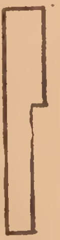


Fig. 4

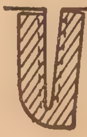


Fig. 5

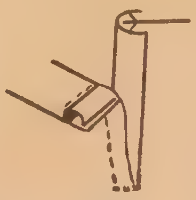


Fig. 6

Gather the back skirt and join to the back yoke in the same way.

Gather sleeves on the upper edges and pin into the armholes, arranging the gathers evenly along the yoke and making the centre of the sleeves match the shoulder seam. Use the single seam again and press the raw edges to lie over the yoke. Join sleeve seams and under-arm sleeves in one operation, using a French seam. Gather the lower edges of the sleeve and fit into arm bands. Machine on the right side, turn under, and finish by hand.

Place the collars and linings together and machine along the outer edges. Snip the outer edges, turn right side out, and press. Pin in place on the neck edge, making the front edges meet at the centre of the yoke front and leaving ½in. at each edge at back yoke.

Take the yoke lining and pin into position over the collar from the right side. The collars will now be sandwiched between the yoke and yoke lining. Stitch all three together along the neck edge. Snip the neck edge and turn lining inside. Pin yoke lining at the shoulder seams, turn under at arm and yoke edges, and stitch down by hand. Turn yoke over lining at back opening and stitch down by hand. Now all raw edges will be covered except the under parts of the armholes, and these should be overcast, turning the raw edges in with the needle as the stitching proceeds.

Next, turn up ¼in. on the hem and stitch close to the edge by machine to prevent fraying. Measure the correct length for frock to suit wearer and turn up the hem; 3½in. will probably be the width. Hem lightly by hand so that unpicking to lengthen will be simplified.

Make button-holes on the right side of yoke and put buttons in corresponding places on the left yoke edge.

The embroidery can be done before the yoke lining is stitched into place or when the frock is finished, but the former method makes the inside neater.

Making the Panties

The knickers are reinforced at the crutch by a piece of the lining material. Take the two pieces and join with a single seam, then join the lower edge of the panties with a single seam also. Pin the lining and the knickers together, wrong sides facing.

Turn under the raw edge of reinforcement and stitch down. If the stitching is done by hand, it is an easy matter to remove the lining and put in a fresh one when it becomes worn or stained. Join the sides by run and fell seams. Make small pleats along the front top to fit the front waist. Face back and front with bias strips to form casing at back. Insert elastic from side seams across the back only. This will have two advantages—only a short piece of elastic is needed, and the front is easily identified when the child learns to dress herself.

PATTERNED FROCK

A patterned frock is cut with a front opening and a one-piece collar, the fronts of which are pointed instead of rounded as on the plain frock. A narrow strapping finishes the yoke and is continued to conceal the opening in skirt front. The edges of the strapping, collar, and lower edge of the crossway bindings finishing the sleeves are trimmed with needle point. Directions for working the edging were given on page 445 in the April, 1946, issue of "The Journal of Agriculture."

This frock is simple in style, but the pretty pale-blue lawn with pattern of single white daisies, green leaves, and deeper blue bow-knots, and the dainty edge trimming make it very attractive.

Photographs by Sparrow Industrial Pictures Ltd.

"The Peter Pan in Us."

WE are going to have a big party on Saturday. It is really Robin's birthday (she will be nine) but her brother has just turned seven, so we are having a combined party. It is fun getting things ready and the children have been helping so that they realise it takes some effort to give a party. We made a roll of gay wallpaper into crowns and the kiddies drew and cut out stars for the front of them and they are going to paste some "glitter" on the stars. These will be a change from paper hats. We have thought out all the games and competitions, so as to be original, and my little girl is going to wear her ballet frock (she is in a recital next week) and be a fairy and give each child a small gift.

We don't care a bit if it rains, as we still have a good programme, but of course, if it is fine, the party will be held out of doors. We have a lovely half-acre section with lots of grass and trees, two swings, and a basketball hoop.

I wonder if the children get as much fun out of parties as we grown-ups do. It must be the eternal Peter Pan in us, I suppose.

—"L.K.A.," Auckland.

Housing Survey of Rural Districts

APART from the present urgent need for more houses on farms and in rural areas generally is the long-term problem of providing an adequate standard of housing for every farm family.

Women are most vitally concerned with housing conditions, and from their practical experience they are in a position to make constructive suggestions. Through their organisations they can see that these suggestions are incorporated in future policy. A recent memorandum issued by the Associated Countrywomen of the World (a condensation was printed in the "N.Z. Countrywoman," May, 1946) emphasises this, and outlines some of the ways in which women can work toward better housing in rural areas.

These include studying housing programmes in other countries and making local surveys; working for the enforcement of regulations governing housing conditions and their reform if they handicap the countryside through being drawn up principally for urban conditions; advocating the demolition of the worst types of housing and the building of model homes to exemplify the possibilities of better living and to create a demand for it. The memorandum also says: "We should be prepared to accept new ways of building and living, translated into terms of each country's best tradition and culture. Our homes should not only be comfortable and efficient but should conform to high standards of design. The technical knowledge of landscape planners, architects, etc., is essential for good results. Building for profit, especially speculative building, should be forced to conform to really good standards of comfort, efficiency, and design."

A survey of rural housing is being made at present by the Rural Sociology Section of the Department of Agriculture to obtain accurate information about the age and size of farm houses, the conveniences they possess, and the housing preferences of families on different types of farms. This information is being sought so that more efficient plans can be prepared for farm houses suitable to New Zealand conditions and based on general preferences. The Department of Agriculture proposes to use these plans in a new instructional service, making them available as suggestions to families who are thinking of building new homes or remodelling old ones.

The co-operation of country women in the survey will be very much appreciated. All information is of course confidential. Fill in the application form for a questionnaire below and post it to the Rural Sociologist for your district.

The Rural Sociologists will also answer inquiries from country women about nutrition, preparation and preserving food, and home management generally. Make use of this service.

North Auckland and Auckland:	**Rural Sociologist, Department of Agriculture, AUCKLAND.**
Taranaki, Wellington, Hawke's Bay, Gisborne, Nelson, and Marlborough:	**Rural Sociologist, Department of Agriculture, WELLINGTON.**
Canterbury, Westland, Otago, and Southland:	**Rural Sociologist, Department of Agriculture, CHRISTCHURCH.**

POST THIS TODAY . .

The Rural Sociologist,
Department of Agriculture,
....

Please forward me..........copies of the questionnaire on Rural Housing.

Name:..
(Block letters)

Address:..
....
....

"The View From my Window"

FROM all parts of New Zealand have come eloquent pen-pictures of our country, famous the world over for the beauty of its scenery. First prize to "Tinkle Tinkle," Dunedin, for the poetic quality of her prose, and second prize to "Arethusa," Cambridge. Highly Commended: "Cloudy," Ashburton, and "X.Y.Z.," Taranaki.

First Prize

WINDOWS! What a magical word! Do you remember houses by their window-views? We have lived in many houses these last five years, and each I remember for a special loveliness—a bedroom window looking right into a damson tree (I occupied that room in the spring, and again in late summer when the tree was heavy with purple fruit, and silver-eyes took the place of the bees); a delightful country kitchen looking out on to a lawn bordered with delphiniums and overhung with an oak tree; and in that same house an upstairs window, small-paned and high up under green eaves which looked down on to an orchard paved with buttercups and hung with pink of apple bloom and white of pear. And the birdsong came up from below. And there was a window that gave a glimpse of mountain and lake through ngaio trees; and yet another opening on to meadows where larks sang and where tall yellow mulleins grew by the fences.

Now we live with hills and sea, with houses and trains that delight the children. Can you imagine living on the rim of a green bowl and gazing down into its blue contents—one of those lovely Chinese bowls you admire so much, having decorations on the inside? The sun and the moon make pathways across the water, the little winds rumple its smooth surface, the big winds lash it to foam. Some days it is as blue as a child's glass beads, some days green, or else like a mirror full of reflections. I've seen it as black as ebony and with a small white boat on it. The gulls fly over in the morning and the evening, in twos and threes, sometimes drifting effortlessly, sometimes hardly making headway against the wind . . . And all around the hills rise up, little hills and a mountain with a road about its summit and white foam houses in clumps of trees. Often the cloud covers the hilltops for days and you wonder what is going on in those little houses which could easily belong to the fairies, so small they look and so near the sky . . . Spring spills white of plum blossom and pink of flowering currant into hillside gardens; summer brings gold of gorse and broom; autumn, bronze and yellow of oak and sycamore in a little wood. Ferns grow there, and in the winter you find delicate skeleton leaves, yellow berries of the native iris, and white everlasting daisies . . .

And immediately below us is a neighbour's garden where the pear tree is already set with silver buds (this morning a charm of goldfinches added their loveliness to bare branches). The little wanda primrose makes purple patches against brown earth . . . What need of wall pictures when a pane of clear glass offers such varying loveliness?—**"Tinkle Tinkle," Dunedin.**

Second Prize

FOR a long time now it has been one of my chief joys to lie at my window and gaze out among the trees, for I can no longer walk out through the garden down to the road. Trees! How I love them, and all those things which go with them. The wealth of golden wattle, the flaming rata, the sweet whiteness of rangiora in her spring gown, and perhaps most beautiful of all, the wind singing among the branches of the tall pines flanking the drive. Here and there a shy garden violet or snowdrop has crept toward the trees from the more orderly beds in the lawn near my window where the daffodils and crocuses grow. Further in are patches of soft moss dotted with nodding ferns and gay, wandering periwinkles. Birds are everywhere, wheeling between the branches, making their homes behind the leaves, and fighting among themselves. The thrush likes to ride upon the end of a bough, whistling happily to the world; the riroriro sends his gay lovelilt echoing forth, and from the green field beyond that bird of the meadow, the skylark, climbs steadily upward into the blue sky, singing until it seems his little throat must break.

Beyond the small world of my garden runs the road, by which good neighbours come and go. This is the road of dreams for the young people, the long road which leads out past the green meadows, the streams, the white lambs frisking in the soft spring sun, past the calves and gambolling foals, past the red-roofed farm houses nestling among the orchards—out to the world. Later they realise, as I did myself, that they are happiest in their own homes, their own green land.

Yes, I love the trees, the brown of the roads, the fresh country air, and now

"From out these honey-laden trees
A tui's burst of song has crowned all
these."
—"Arethusa," Cambridge.

Highly Commended

THE view from my windows would take the pen of a Conrad to do justice to the ever-changing vistas of sea and sky. Behind us Egmont raises a perfect white cone, flanked by ranges of deepest blue. Low hills encircle us in a horseshoe and then stop suddenly, while we look down over low, greenish-brown hillocks, slightly marred by a few tall, spiked derelicts which are all that remain of the dense forests that once covered the district. Beyond stretch the wooded plains. It is a wide and satisfying view, but its beauty lies in its constantly-changing colours.

Tonight the sky is a faint blue, and heavy with brightly-edged clouds such as the old masters placed around their angels' heads. Away to the left, where the sun is setting, the remains of the ancient forests stand like black sentinels against a level, blue-grey sea, and one bright patch, like a lake of molten silver, dazzles the eyes. As the night deepens a faint blush of pink marks the clear horizon, and the sea and sky are now a uniform shade of palest grey. Last night the sunset was a symphony of blue, grey, and silver, resembling a Whistler picture with a misty sickle of a moon pointing to a single star.

On a fine morning the intervening hills are a vivid green. The trees on the hills below stand out clearly against the sea, where the water, a deep Mediterranean blue, dances with a gay little sparkle. In a southerly gale angry white horses ride the waves which thunder in and break in a creamy foam where the sea and land meet. All the force of the Pacific is behind them.

These are some aspects of our view and we go about our work deeply thankful that our lives have been cast in such pleasant places.—**"X.Y.Z.," Taranaki.**

FREE

TO FARMERS!

FARM & HOME
MAGAZINE

A complimentary copy of the "Exporter and Farm Home Journal" will be posted to you free of charge if you send your name and address to Publishing Dept. JA, N.Z. Dairy Exporter, P.O. Box 1001, Wellington.

The purpose of this offer is to make known to the farmer and his wife and family, the interesting, instructive and enjoyable reading obtainable in the "Exporter." Send for your Free Copy today.

Send Your

WATCH REPAIRS

Practical Craftsmen busy in our modern workroom.
Their painstaking work assures results.
If not worth repairing your parcel will be posted back to you.

THE JEWELLERS

JEFFERIES

MANCHESTER ST., CHRISTCHURCH

3-DAY WATCH AND CLOCK REPAIR SERVICE.

SEND FOR OUR SIGNET AND WEDDING RING CATALOGUE.

"HURRAH! it's back again!"

SOLD EVERYWHERE
EDMONDS
PRIZE
BAKING POWDER
SURE TO RISE
REGISTERED

Yes, it's true . . . that old favourite, Edmonds famous 'Sure-to-Rise' pure grape cream of tartar Baking Powder, is on the market again. So make your favourite cakes, scones, loaves, etc., once again with this old established favourite, the Baking Powder that before the war was used in over 90% of New Zealand homes.

for perfect Baking, use only

EDMONDS *Sure-to-Rise*

Genuine Grape Cream of Tartar **BAKING POWDER**

36.6

EGG RATIONING WON'T WORRY YOU

IF YOU USE

NORTON'S
PREMIUM
EGG
PRESERVATIVE

NORTON'S

EGG PRESERVATIVE

LIQUID OR PASTE

Preserve regularly with Norton's when eggs are plentiful and ensure an ample supply when eggs are rationed.

SOLD EVERYWHERE USED EVERYWHERE

RECOMMENDED BY AUNT DAISY

Manufacturers: J. T. NORTON LTD., Lyttelton.

THE "N.Z. JOURNAL OF AGRICULTURE"

Subscriptions: 2/6 a year, 4 years 10/-. Overseas subscriptions: 5/- a year. Subscriptions may be paid at any office of the Department or direct to, The Publisher, Department of Agriculture, Box 3004, Wellington.

First Aid in the Home

THE treatment of wounds was dealt with in the first of this series of articles by C. Meachen, secretary to the St. John Ambulance Association, Wellington. In this, the second of the series, some of the more common accidents and emergencies that occur in the home are described and their correct first aid treatment outlined.

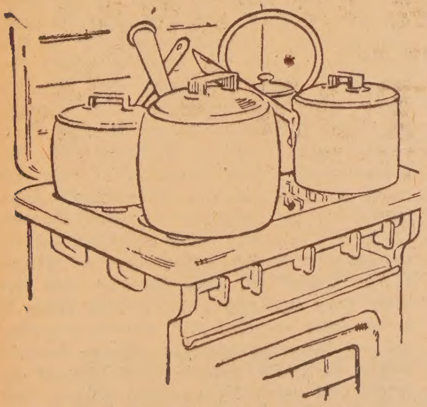
BURNS AND SCALDS

A BURN is caused by dry heat produced by flame, friction, or contact with electric cables. The same principles apply to their treatment as to other injuries, but differences in emphasis are necessary. Patients with burns are particularly likely to suffer from shock, which is best treated by keeping them warm and not allowing unnecessary movement.

Furthermore, burns are likely to involve rather wide areas and leave considerable tissue in a condition of reduced vitality. Great care must be taken to avoid further damage to the already weakened tissues, and bacterial contamination is even more serious than in other injuries.

"Prevention is better than cure," and simple precautions such as having all pot handles and kettle and teapot spouts turned inward on the stove will prevent the majority of such accidents in the home. Hot water jugs, cups, or basins of hot liquids, and even plates of soup on the table, must be kept out of reach of those curious little people whose fingers are always ready to grab at something. Great care must also be taken when using electrical appliances.

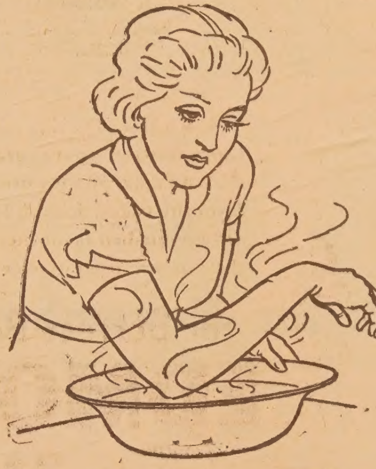
Dressings: Dry dressings are to be avoided, as they will stick and perhaps be impossible to remove, resulting in further damage to the tissues. Greasy dressings (oils or ointments) are also to be avoided—not because they are intrinsically harmful, but because, if a doctor later decides that tannin is necessary, he will have to remove every trace of grease.



Turn inward the handles of cooking utensils on a stove.

Wet dressings, covered if possible with cellophane or oiled silk to prevent drying, are soothing and do not stick. Solutions which may be used are:

1. **Strong cold tea,** which can be kept available by nearly filling the teapot after use;
2. **Bicarbonate of soda (baking soda),** which may be kept in a jar in the emergency cupboard clearly labelled "For burns or scalds—one dessertspoonful in one pint of warm boiled water."
3. **Epsom-salt,** two packets to a pint of warm water.

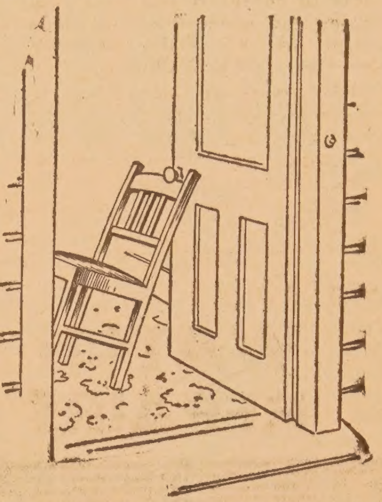


Test with the elbow the temperature of water in which it is intended to immerse injured parts.

Carefully remove the clothing from the injury. Cloth which is stuck to the flesh should be cut away carefully around the affected area and the adhering pieces left in position. Blisters which have already formed must not be removed.

Prevent the air getting to the injury until it can be dressed. This may be done by immersing the injured part in warm water of body temperature (test the water with your own elbow). If warm water is not handy, cover the injury with a piece of lint or cloth and cotton wool, and bandage lightly. To dress the injury when everything is ready cut gauze or linen into narrow strips and place them in one of the solutions mentioned. (Baking soda solution must be kept well stirred.) Allow them to soak and keep them moist until medical aid comes, should that be necessary. If you apply these dressings yourself, cover them with cotton wool and bandage lightly. Burnt or scalded patients may be allowed to drink freely.

Should a young child be badly scalded or burnt, at once, without removing the clothing, place the child in a warm bath to which has been added bicarbonate of soda, and keep the patient there until the doctor comes. This treatment both soothes and lessens shock. Outer clothing which can be quickly taken off without adding to the pain may of course be removed.



If you are alone in the house attending a patient until the doctor arrives, leave the door propped open.

CUTS AND SCRATCHES

Minor wounds should be held under a tap, washed with soap and water, and allowed to bleed for a time. Carefully remove any foreign body such as glass, thorns, or metal which can easily be seen, but never probe a wound to remove a foreign body—leave that to a doctor. Cleanse the wound with an antiseptic—salt and water may be used if nothing else is immediately available—then bandage firmly with a dry dressing. Salt as an antiseptic should be used at a strength of one teaspoonful to a pint of water which has been boiled.

Leave the dressing undisturbed for a day or two to allow the wound to seal over, then replace it with a smaller dressing.

In the event of undue soreness, redness, or swelling obtain medical help, and do not delay in doing so.

CONVULSIONS

Convulsions in babies and young children may be indicated by twitching of various parts of the body, by occasional squinting, holding the breath, or frothing at the mouth. The face will become pallid and later blue. At ONCE send a message to the nearest doctor, and in the meantime strip the patient and place the child in a bath of warm water so that the whole body is covered up to the neck. Support the head and keep a flannel, dipped often in cold water, applied to the top of the head. Should the patient quieten, remove him from the bath and wrap in blankets, but continue to keep the head cool. Should the convulsions return, place the patient back in the bath and continue the treatment as before. One word of advice: If you are alone in the house, leave the door on the latch or propped open so that the doctor can enter without your having to leave the patient.

FAINTING

Fainting, another condition with which housewives may often have to deal, can be brought on by various causes. The patient turns giddy and loses colour and the skin becomes cold and clammy. Collapse usually follows. Remove the patient to fresh air, or if that is not possible open all doors and windows. Sprinkle the face with hot and cold water alternately, and massage the wrists from the hand toward the heart. Apply smelling salts to the nose. **Give nothing by the mouth.**

HYSTERIA

Hysteria, which mainly affects young people, particularly girls, is a kind of fit. The patient becomes excited and may cry, laugh, scream, kick, scratch, bite, and grind the teeth. Often the eyeballs turn upward and there is frothing at the mouth. You must be extremely firm with a patient in this condition and speak in a quiet, commanding voice without shouting. You must keep very calm yourself, as any agitation will not help the patient. When the attack is over the patient should be left alone quietly to recover.

EPILEPTIC FITS

Although not as common as hysteria, epileptic fits occur often enough to warrant some knowledge of treatment. The patient usually falls, sometimes uttering a short, sharp cry, and there may be quick, jerky movements or twitching of the limbs. The face turns red, then grey, and frothing at the mouth occurs. The first duty is to see that the patient is lying in a space clear of furniture and away from walls. Then wrap a handkerchief around something hard, such as a clothes peg or stick, and hold it between the patient's back teeth to prevent the tongue being bitten. Support should be given to the head which should be kept turned slightly to one side. The patient's movements should be restricted no more than is necessary to prevent injury. Loosen all clothing from the neck and chest so that breathing is not restricted.

Some Garden Work for November

ANNUALS may still be sown out of doors to provide late displays of flowers, but germination is likely to be poor if the soil is dry. Provided there is moisture below the surface, the bed should be trodden firm and the top raked to make a seed-bed. Sowing seeds in the midst of a dry powdery layer of soil is useless, as they require to be in contact with a moist soil to germinate.

Biennials (wallflowers, sweet Williams, Canterbury bells, etc.) should now be sown in later districts to produce plants suitable for planting out in March. In warmer districts sowings should not be made until December at the earliest.

Lavender is easily propagated at this time of the year by pulling off young shoots, with a "heel" of old wood, when they are about 3in. long. The cuttings should be put 1in. deep in sandy soil in a cold frame, and watered in. They will root in a few weeks, and should be planted out when they show signs of growing.

Pegging Annuals: Bending down the stems of *Phlox Drummondii*, bedding verbenas, and hybrid petunias when they had made sufficient growth after planting, and pegging them down to the ground with wire "hair-pins" sold for the purpose, used to be a common practice. Numerous side shoots developed from the prostrate stems, ensuring a fine, compact display of blooms. It is worth while to go to this trouble in the home garden, though pegged annuals are not often seen now.

Planting: November is a busy month in districts where it is unsafe to put out tender plants until likelihood of frost is past. Dahlias, half-hardy annuals, chrysanthemums, geraniums, begonias, heliotrope, and other subjects which will not stand much frost may be planted when it is considered that danger of frost is past.

Polyanthus, early-flowering primulas, and primroses should be lifted, divided, and replanted now. These all produce the finest flowers the first year after planting, and they repay annual division except where they are naturalised in grass. When the plant is lifted, the soil should be shaken away and the root pulled apart. It tears easily into a number of separate rooted crowns, which should then be planted firmly. Polyanthus and primroses succeed best in a situation where they get sun in the early spring but are in the semi-shade in the summer months when the sun is hottest.

Pruning shrubs: Where flowers are produced in spring or early summer on shoots which grew last year, pruning should be done as soon as the flowers fade. This consists of removing, as far as possible, all the shoots which have flowered, so that the strength of the plant is directed to producing ample new shoots during the remainder of the summer and autumn to flower next year. The earlier the shrubs are pruned the more time new shoots have to grow and ripen. Shoots or branches which have not flowered usually should not be pruned at all. Shrubs which should be pruned in this way as soon as the flowers fade include lilacs, deutzias, diervillas (weigelas), flowering currant, forsythias, *Spiraea arguta, Cytisus praecox*, and other similar brooms. Flowering brooms of the garden types soon become leggy and unsightly unless pruned every year as soon as they finish flowering, but care must be taken to leave an inch or so of last year's growth when pruning each shoot. The brooms will not readily produce shoots from old wood and too vigorous pruning may kill the bushes.

Rhododendrons and azaleas should be given a good soaking of water and, if necessary, mulched with any form of organic matter, including sawdust, which is used with success by many expert rhododendron growers. Seed pods should be picked off as soon as possible after the flowers fade. Seeds are set in such abundance by some types that to ripen them all makes a great drain on the strength of the plants and interferes with production of ample new shoots to flower next year.

Tulips often produce a striped flower instead of one of the colour normal for the variety. This is because the plant has become infected by a virus disease known commonly as tulip "break" or "stripe." The disease is spread from plant to plant by aphides, usually during the growing season, and in New Zealand especially, at the flowering stage. A healthy plant infected at that time will not usually show any symptoms of the disease until the following year. It may then show faint yellow striping of the leaves, but these symptoms may be hard to see and the only easily-seen symptom is striping of the flower. Once a plant has been infected all its progeny will be infected too. **There is no "cure" for this disease, and the only way to keep a stock free from it is by very careful and drastic roguing out of infected plants. When flowers begin to show colour they should be inspected carefully every morning, and all plants showing any sign of "stripe" dug up carefully and burned.**

Printed by Blundell Bros. Ltd. (The Evening Post), Wellington—20588

"Caterpillar"

REG. TRADE MARK.

can take it!

"Caterpillar" Diesel Tractors "can take it" and deliver service no matter how tough the job. The wonderful service being given by "Caterpillar" Diesel Tractors is the direct result of exclusive design, inbuilt qualities and PRECISION construction. Working to tolerances in terms of millionths of an inch on Fuel Pumps, Injectors, Cam Shafts, Crank Shafts, etc. THAT'S Precision. How do YOU benefit from "Caterpillar" precision? Why! By the extra years of life that are built into every "Caterpillar" Diesel Tractor. It doesn't matter what model you buy—whether it's large or small. The same rigid inspections, and precision tests are carried out on the PRECISION MADE parts that go into the precision built "Caterpillar" Diesel Tractor.

There's only one "Caterpillar"

The name "Caterpillar" is the property of the Caterpillar Tractor Company of Peoria, Illinois, manufacturers of the original track-type tractor and the oldest and largest makers of track-type tractors in the world.

Caterpillar

GOUGH, GOUGH & HAMER, LTD.

Head Office and Showrooms: 145 CASHEL STREET, CHRISTCHURCH.
Branches at:—Auckland, Wellington, Dunedin, Palmerston North, Rotorua, Hamilton, Taumarunui, Masterton, Hastings, Timaru, Oamaru and Invercargill.

PERFORMANCE *depends on* PEDIGREE

LISTER BALL BEARING
CREAM SEPARATOR

THE LISTER PEDIGREE

The Quality and Efficiency of the LISTER is guaranteed by the fact that it is a product of the largest Separator factory in the British Empire. It is made by the same engineers who build the world-famous LISTER engines and shearing machines.

Staybrite Stainless Steel can never rust. It cleans as easily as glass and will last indefinitely.

THE ONLY SEPARATOR WITH

STAYBRITE

STAINLESS STEEL

BOWL AND DISCS

Lister

LISTER SEPARATOR CO. (N.Z.) LTD.
HEAD OFFICE: P.O. Box 63, Auckland.
Branches at Hamilton and Palmerston North.
Service Representatives in every District.